June 16, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 51

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JUN 17 1947
DETROIT

recent installation of a modern

HIGH SPEED

UR-HIGH TANDEM MILL

for the cold reduction of
Stainless and Silicon Steels

DESIGNED AND BUILT
by
MESTA

MESTA MACHINE COMPANY · PITTSBURGH, PA.

"We're Induction Hardening 4-a-Minute Without Distortion!"

—SAYS AUTOMOTIVE PARTS MANUFACTURER

"THESE THIN-WALLED clutch collars are a typical hardening problem with us. Subject to severe stresses, they have to retain *original ductility* . . . yet wearing surfaces must be hard. With our new Allis-Chalmers Induction Heater we're hardening wearing edges to a depth of 1/32" and we're getting 250 Units per hour!"

IS HARDENING YOUR PRODUCTION BOTTLENECK?

Or is it Brazing? Soldering? Annealing? Forging? If it's any of these, why not find out today how induction heating can be applied to your job. Write for Bulletin 14B6430 "Selective Heat" which describes induction heating and its application to industry. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2104

Problem:
Harden to 1/32" depth only
Only Three Simple Steps Necessary:
1. Place collar in simple jig.
2. Lower control handle to close start switch.
3. Raise handle—collar drops out of jig into quench . . . 4-a-minute.

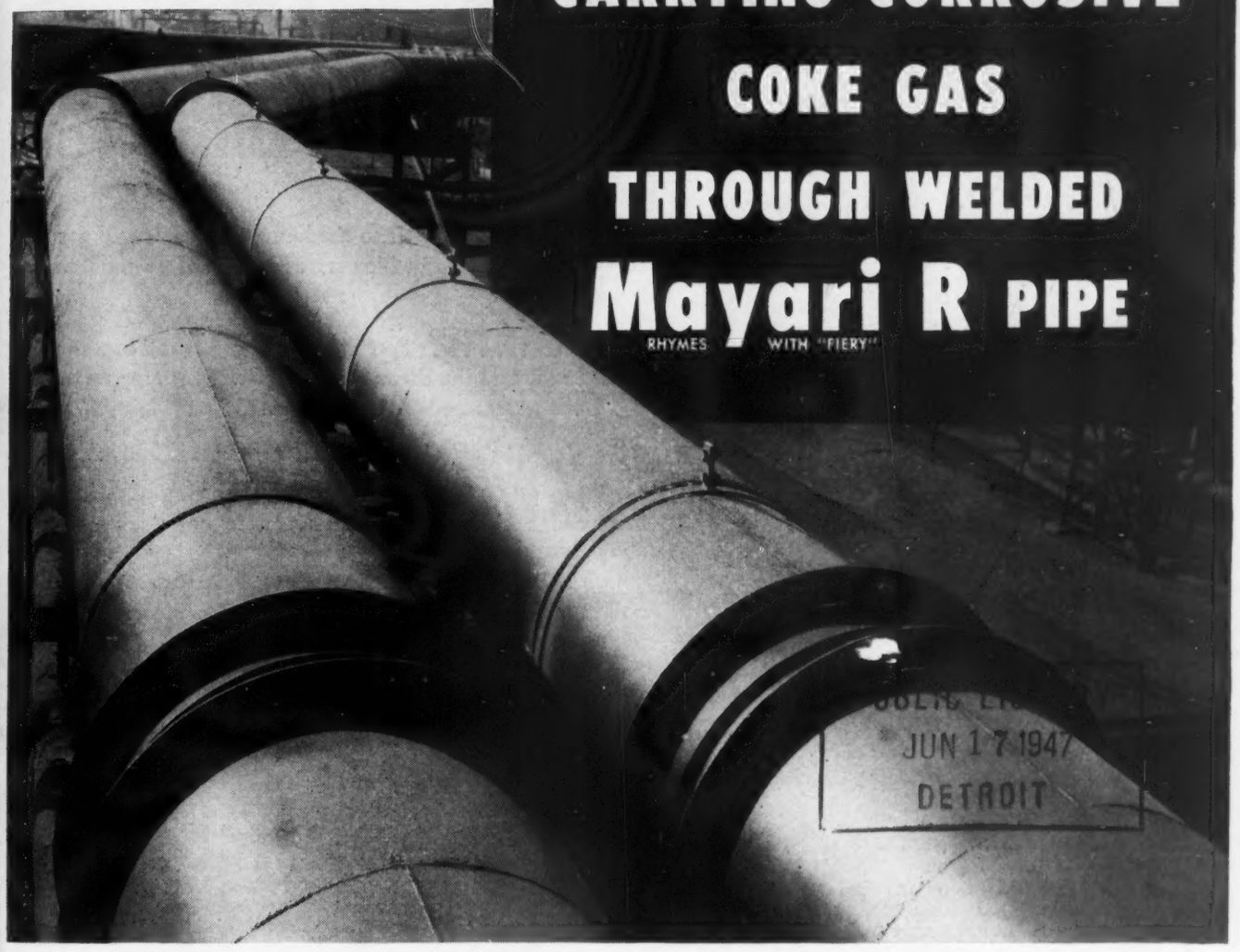
ALLIS CHALMERS

One of the Big 3 in Electric Power Equipment
★ Biggest of All in Range of Industrial Products ★

INDUCTION HEATERS

CARRYING CORROSIVE COKE GAS THROUGH WELDED Mayari R PIPE

RHYMES WITH "FIERY"



42-in. diam welded Mayari R pipe line. One section carries coke gas from the saturators to the scrubbers; the other section returns the gas from the scrubbers to the ovens for fuel.

Every day 68,000,000 cu ft of highly-corrosive coke gas flows through this 42-in. Mayari R pipe line.

At one stage of processing, the gas is carried from the saturators to the scrubbers through a 550-ft section of pipe. Here the gas is particularly corrosive due to its acid content. At a later stage the gas is carried from the scrubbers to the coke ovens through a 619-ft section of pipe. Here the gas is clean and far less corrosive.

Both sections of pipe were made of 5/16-in. Mayari R plate, with all-welded construction. The supporting framework was also fabricated of Mayari R shapes and angles.

Mayari R was used for this entire job because of its high resistance to industrial-atmospheric corrosion. Tests in various localities show that Mayari R has five to six times the life of mild-carbon steel exposed to fume- and smoke-laden industrial atmospheres.

Besides its corrosion resistance Mayari R has other properties of importance to designers. It is a low-alloy, high-strength steel, and is often used to reduce deadweight without sacrificing strength. It is also used to increase strength of certain sections without adding to their deadweight. The combined characteristics of this versatile steel make it well suited for many industrial applications.

For further information on Mayari R write or phone the nearest Bethlehem district office for Catalog 209.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

Mayari R *makes it lighter... stronger... longer lasting*

Salt of the Earth!

...Compressors and Blowers

SALT? Yes, like salt to the human body, air and gas compressors, and turbo-blowers are essential to modern industry.

THE EARTH? Serving on *land* and *sea* all over the earth you'll find hundreds of thousands of many types of I-R Compressors and Turbo-Blowers.

SALT OF THE EARTH? By that we mean the best in *quality*... quality that a manufacturer builds into the machine to assure lower-cost operation, greater dependability, and longer life.

Ingersoll-Rand has always endeavored to design and build the best compressors and turbo-blowers in the world, to properly apply each machine to its job, and to make sure that each compressor meets the conditions for which it is sold. These are good reasons for consulting Ingersoll-Rand the next time you have a problem of compressing air or gas. There is a branch office near you.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 1-946

In intricate processes I-R Compressors, Vacuum Pumps, and Blowers create vacuums and pressures up to 15,000 psi, making it possible to produce huge quantities of gasoline, synthetic rubber, synthetic ammonia for fertilizers and explosives, plastics, and an ever increasing number of new chemical and petroleum products. Turbo-blowers, in sizes up to 21,000 hp, provide combustion air for producing iron, steel, copper, etc.

Compressors distribute gas to industrial centers and push partially spent gasses back into oil-field sands for future use. They compress refrigerants that preserve foods in shipment and storage.

In mines, on production lines, on highways and construction jobs, and aboard ship, compressors generate the Air Power that performs thousands of jobs quicker, easier, and cheaper, and many that cannot be done in any other way.

The World's Largest Builders of Air and Gas Compressors

It soaked up the shock of 10 million crashing tons

A typical example of B. F. Goodrich product development

IT WAS only a 390 foot haul—but it proved to be a costly one. Huge hunks of coal had to be carried from a railroad siding to a barge dock on the river bank below. A belt conveyor system was the obvious answer. So one was built and put into service.

Everything was fine—until the belt wore out before it had carried 4 million tons. Now that much coal will heat a lot of houses. But it wasn't enough to make the belt a good investment. The second belt was even worse—just over 3 million. And the third one, which went 5½ million tons, still added too much to the cost of the coal.

Then the coal company—and the mining industry—got a break. B.F. Goodrich belting engineers developed a new kind of belt in which hundreds of individual cords—each completely embedded in rubber—replaced the usual stiff fabric "carcass." They added a top ply with the cords running across the belt. When heavy hunks of material hit the belt it "gives" in both directions—absorbs the shock instead of fighting it. One of these cord belts was installed to carry the coal to the barge dock. Up to now it has handled *over 10 million tons and is still in service.*

No one knows yet just how much the cord belt will reduce handling costs for this company. But there are records of other cord belts which have lasted *10 times as long* as conventional belts—each one a typical example of the results of B.F.Goodrich research and product development. *The B.F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

Behind the Scenes...

Rain Gone, Heat's On

Looks like summer is with us at long last. Our geraniums have all turned into watercress and the robins in the eaves have all grown webbed feet so they can run across what used to be referred to in polite circles as a lawn. But that is a thing of the past. We can now look forward to heat waves and salt tablets, and in the stadium across the street the Indians will start having summer complaint. Back here at our orange crate desk under the steam pipes we will be busily converting STEEL's census bureau over to the Standard Industrial Classification system, prescribed by the government for all ailments of industrial classification and really not a bad thing at all. We have been studying the thing for the past two years and the boys and girls who work on STEEL's Master File of the metalworking industry have been busily reclassifying some 30,000 plants in the United States on the new system. It's about ready for use, and another first for STEEL. Do you mind covering your eyes while we strut proudly by? You'll no doubt be hearing more about this classification system later on.

Holes a la Hubbard

This week you'll find the third article in Guy Hubbard's series leading up to the Machine Tool Show on page 88. Has to do with drilling, which reminds us that summer is always our time to visit the dentist. We know only one person who looks forward to a visit to the dentist, and that isn't us. Doesn't help any even to reflect that Brother Hubbard knows more about drilling than most dentists, either. However, if you would like to learn more about modern drilling methods, take a hop, skip and jump back to page 88 and have a look.

Advice on Nice Lice

Charley Zerr of Union Wire Rope Corp. out in Kansas City (Mo., that is) calls our attention to a new scientific treatise propounded by one of their bright young metallurgists, a fellow by the name of Litman. Probably remembering our cavalier treatment of the Turbo-Encabulator of last year, Charley points out that both us and the industry might be interested in learning more about the carbon louse. Now we aren't above admitting acquaintance with a few assorted lice, although most of the ones we know are from licia typosis, or the type louse family. They're the little fellows who act so often as our private press agents and slip "etaoin shrdlu" into wedding announcements, ads for women's unmentionables, reports of last Sunday's sermon and other places where no shrdlu should ever be. This genus unearthed by Litman must be a cousin. It is the carbon louse, of the family licia blackblackus. To quote Mr. Litman, "Carbon is an exceedingly important hyperschycontic carrier of organisms living at the high temperatures at which steel is rolled. The organism especially harmful to carbon is the carbon louse. At the high temperature it loves so well it begins to become very active and aqua regia occurs. Then suddenly rigor mortis sets in and failure occurs in the austenite of the steel." The explanation of Litman goes on for some paragraphs, too long to reproduce in full here, but it is well documented by an actual photomike of the louse in action, clawing a hole in a steel bar. The condition, according to Litman, is due to a skezophrenic condition of the louse's lower liver. No cure is known as yet. That, you will have to agree, is a lousy explanation of failure of steel at high temperatures!

Cut Those Nails

Down in the backwoods of West Virginia there's quite a market for cut nails, according to M. W. Scanlon, who used to be a jack-leg carpenter down there but who now hails from Oreland, Pa. He says he used to work for a carpenter with a full beard who swore that cut nails driven at an angle will hold as long as there is any wood left to hold in. For that reason, they cut down on depreciation and replacement costs, says Mr. Scanlon, who thinks we ought to get busy and find a source of cut nail machines for our friend in New York who wants to make them. So far nobody has come forward with an offer to sell such machines, but with an established and accepted market now all staked out, or perhaps we should say nailed down, the prospect may be more attractive.

Twelve Candles

If anybody wants to wish us many happy returns, we'll record briefly in passing that this marks our twelfth birthday. In our maiden appearance back in June of '35 we noted that our family of readers numbered 50,000 and that gives us the opportunity to point out that the number has doubled in the intervening years. We'll be humble, though, and not take all the credit for that whopping increase. The editors had a *little* to do with it.

Shrdlu

(Editorial Index—page 51)

STEEL
Vol. 120—No. 24 June 16, 1947

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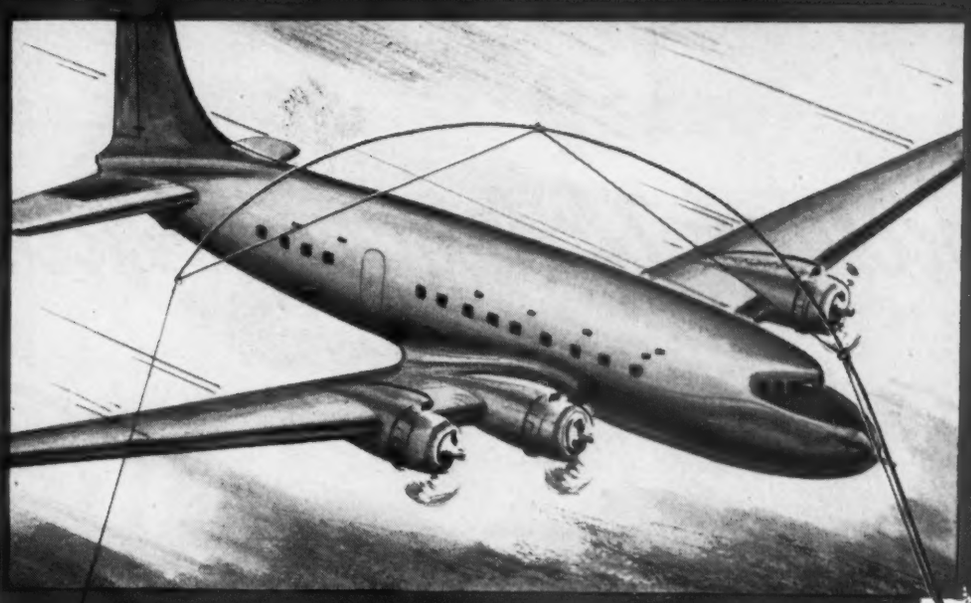

For anything that moves

SHARON ALLOY STEEL

Trout rods to transport planes—hard, tough, resilient Sharon Alloy Steel makes products lighter, stronger, more wear-resistant.... makes them less costly, too.

Because of special characteristics of strength and endurance.... because of high resistance to abrasion.... parts made of Sharon Alloy Steel—part for part—can be made *lighter.*

This means Sharon Alloy Steel gives *more parts per ton*.... more parts per ton means lower material costs, lower shipping costs of finished products.

If your problem is the choice of a proper alloy steel or its method of fabrication, consult Sharon's staff of experienced metallurgists. Write or call the nearest Sharon field office *today.*

SHARONSTEEL

SHARON STEEL CORPORATION
Dept. S.
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ODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO, DETROIT TUBE AND STEEL COMPANY, DETROIT, CHIGAN; BRAINARD STEEL DIVISION, WARREN, OHIO. Hot and Cold Rolled Stainless Strip Steel — Alloy Strip Steel — High Carbon Strip Steel — Galvanite Special Coated oducts — Cooperage Hoop — Detroit Seamless Steel Tubing — Seamless Steel Tubing in Alloy and Carbon Grades for Mechanical, Pressure and Aircraft Applications — Electrical el Sheets — Hot Rolled Annealed and Deoxidized Sheets — Galvanized Sheets — Enameling Grade Steel — Welded Tubing — Galvanized and Fabricated Steel Strip.

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From out of the scrap pile

Chips from an "Automatic", like that below, imbedded in a Bakelite block for microscopic study and grain hardness measurement.

comes better

MACHINABILITY

● To most people, steel chips from an automatic screw machine are just so much scrap—useful only as part of a furnace charge in making new steel bars.

Not, however, to the metallurgists in Republic's Union Drawn Steel Division laboratories. To them, steel chips tell an important story – provide a valuable source of information about the machining characteristics of steels.

Chip samples are selected at regular intervals for studying changes that occur in the steel during machining—right down to Knoop Hardness readings of individual grains in the chips.

That's because MACHINABILITY takes precedence over everything else at Union Drawn—and extreme care constantly is exercised throughout laboratory and mill practices to make sure that nothing is overlooked which might help to improve this property. Also, Union Drawn engineers spend long hours studying the performance of various steels under actual production conditions in customers' plants.

And that's why Republic Union Cold Drawn Steels:

1. **Enjoy top ratings on speeds and feeds.**
2. **Are highly uniform in machinability.**
3. **Produce smooth, bright machined surfaces.**
4. **Are remarkably free from abrasive elements.**
5. **Reduce wear on tools—save grindings.**
6. **Help increase production efficiency.**
7. **Make possible greater output—lower cost.**

To further improve MACHINABILITY, Union Drawn also offers all modern forms of furnace treatment—annealing, normalizing, spheroidizing, stress relieving and other heat treatment.

Right NOW is the time to learn what this better MACHINABILITY can do for you. Write us.

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UNION COLD DRAWN STEELS
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Free-Machining Bessemer, Alloy and Enduro Stainless Steels
•
Union Cold Drawn Special Sections
•
Union Cold Drawn and Ground Rounds; Turned and Polished Rounds; and Turned, Ground and Polished Rounds (Union Precision Shafting.)

NOT HOW MANY PIECES but HOW MANY *Dollars*

ALL EMPHASIS, for nearly a decade, has been on production—how many finished pieces could be counted at the end of the day—more often than not a working day of 24 hours. Overtime charges, high machine maintenance, scrap loss—all these were negligible factors—get production regardless of cost!

Now, with the return of competitive selling, the picture is changed. Certainly manufacturers want production, but they want it as a means of holding down costs. They want high machine production at the end of a regular 8-hour working day. They want production without paying high overtime rates to get it. They want production without high expense for tool breakage or machine maintenance and repair. They want to minimize charges for scrap loss due to inaccuracy, or work spoilage under pressure for volume.

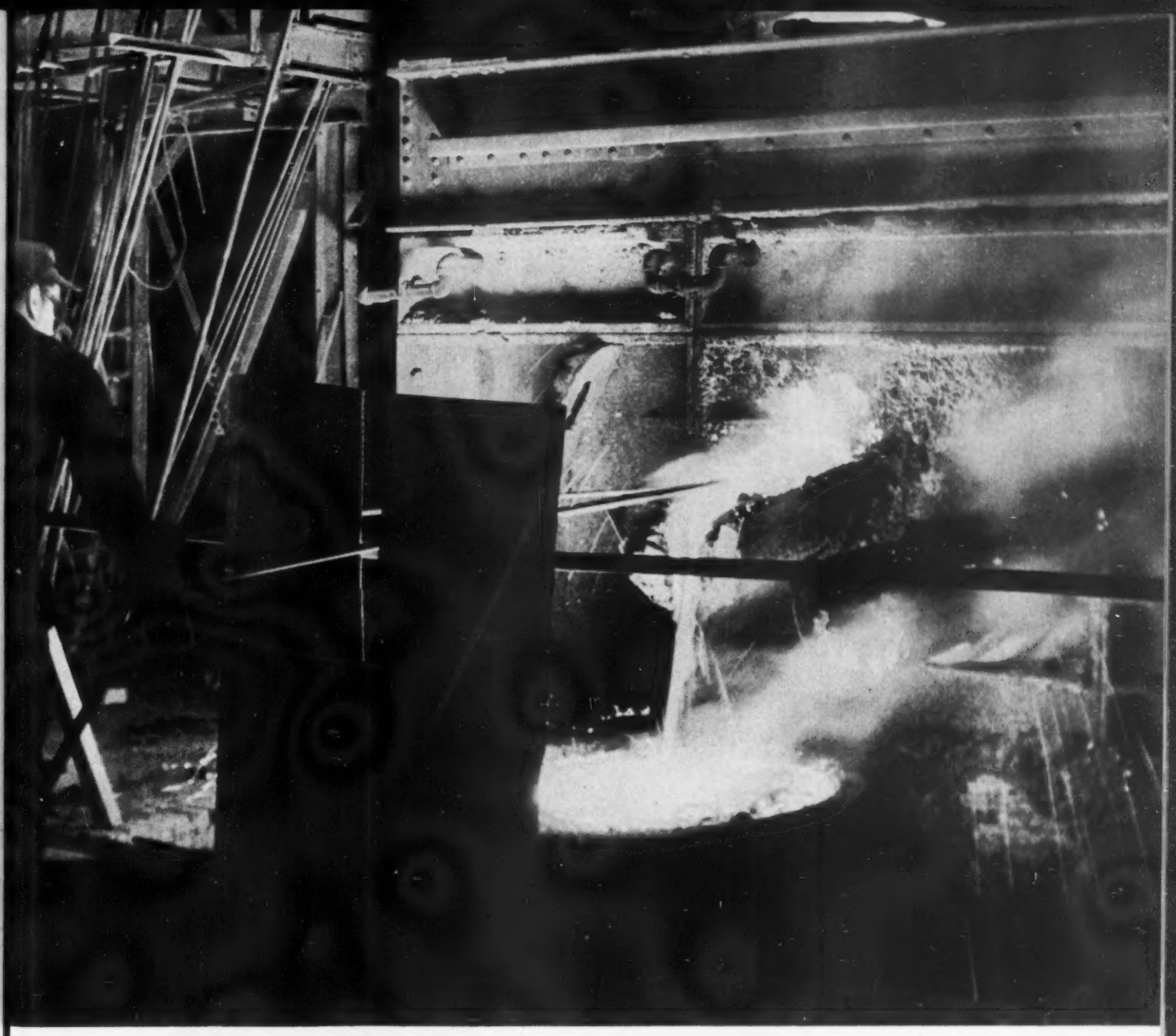
To get that kind of production—low cost production—requires machine tools that are truly efficient—fast, accurate, rugged.

In the metal turning field, a Warner & Swasey field engineer can aid in detecting machine tools which, weighed against today's requirements, are no longer profitable producers. Warner & Swasey gladly offers you the services of these experienced field men at a time when low-cost production is so important to our national economy.

You can machine it better, faster, for less... with a Warner & Swasey

WARNER & SWASEY
Machine Tools
Cleveland

TURRET LATHES, MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES



Highest Quality Steels
MADE WITH VANCORAM FERRO VANADIUM

The high quality of Vancoram Ferro Vanadium, consistent from lot to lot, assures the steelmaker closer control during production and a finished product of unexcelled microstructure and physical properties. The alloy is produced in the following grades to meet the requirements of various products and manufacturing technics:

	Typical Composition
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-40% Silicon . . . . max. 12% Carbon . . max. 3.50%
GRADE "B" *(Crucible)*	Vanadium . . . 35-45% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% Silicon . . . max. 1.25% Carbon . . max. 0.20%
HIGH V GRADES	Vanadium . . . 50-55% 60-65% 70-80% Silicon . . . . . Low Carbon . . . . . Low

Large stocks are carried of all grades of alloys, and they can be supplied in any of the standard lump, crushed, or mesh sizes.

Our metallurgists will be glad to assist you in the application of Vancoram Ferro Vanadium to meet your specific requirements.

MAKERS OF FERRO ALLOYS VANCORAM *CHEMICALS AND METALS*

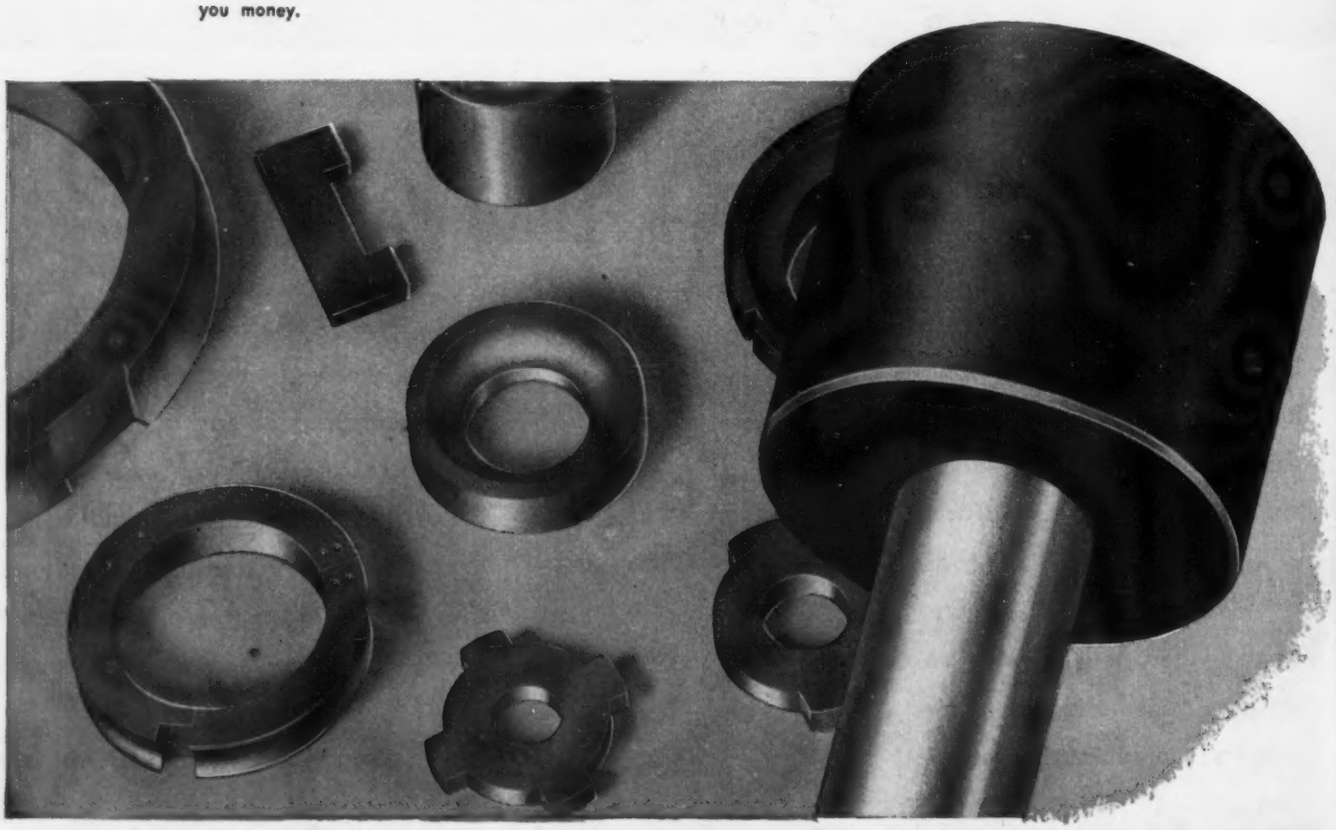
VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

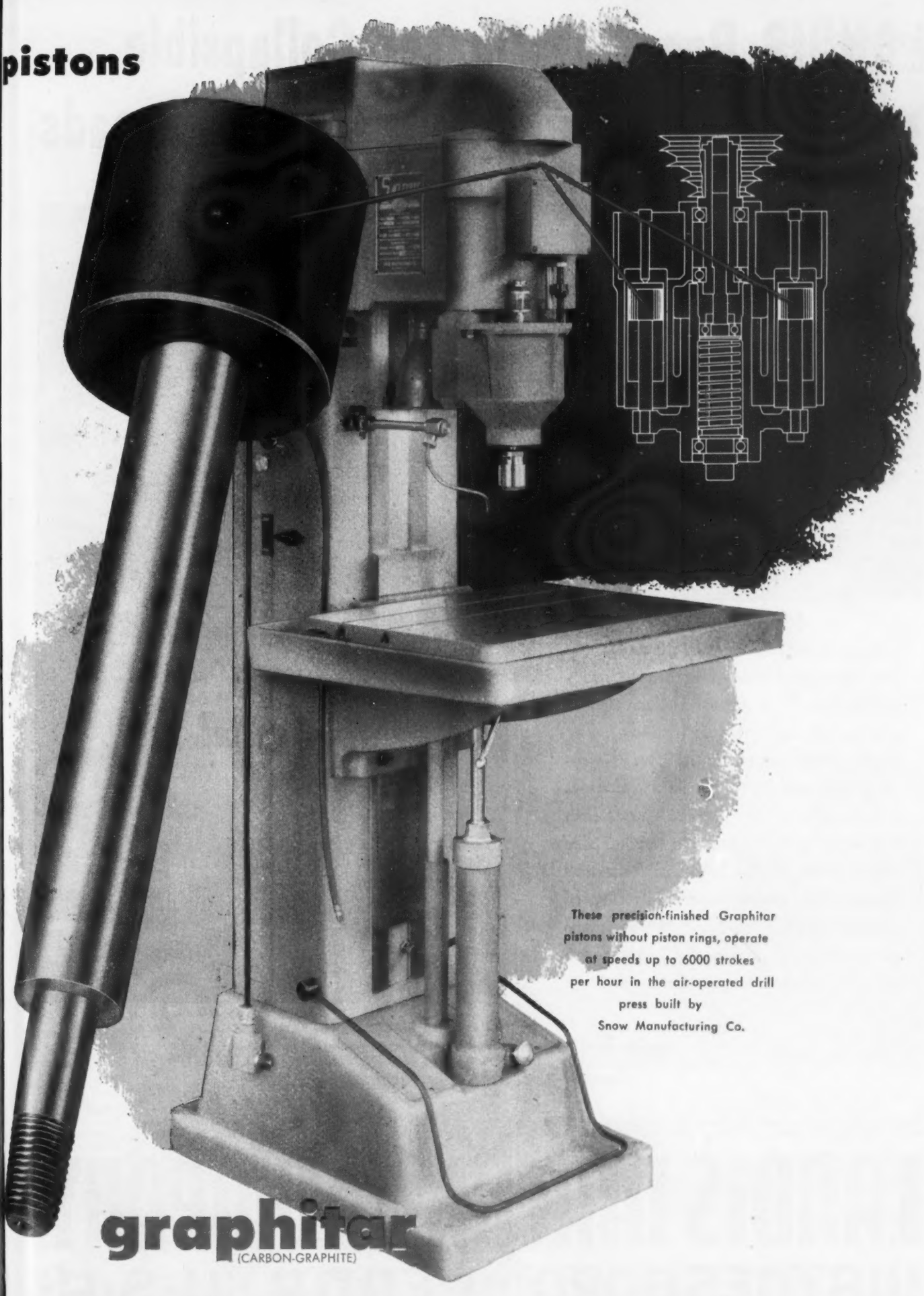
Precision finished graphitar (CARBON-GRAPHITE) operate up to 6,000 strokes per hour in SNOW drill press

GRAPHITAR PISTONS. The smooth, power-packed performance of this air-operated drill press built by the Snow Manufacturing Co. of Chicago depends to a great extent upon the two Graphitar pistons in the cylinder head. Here, as in so many other vital installations in a wide variety of mechanisms, Graphitar proves its efficiency under the severest conditions. These pistons, without piston rings, operate flawlessly, even at speeds up to 6000 strokes per hour. Their precision finish assures instant response to air line pressures which vary from 8 to 100 lbs. per square inch—and that means sure sensitivity of operation. They require minimum lubrication and maintenance because Graphitar is self-lubricating. They are strong and tough—they help prevent costly breakdowns—and they contribute substantially to the reputation for dependability enjoyed by the Snow Air-Operated Precision Drill Press throughout industry.

OTHER GRAPHITAR PARTS. Graphitar seals, bearings, pistons, cylinder liners, and other parts are helping to maintain high efficiency in many types of mechanisms such as compressors, pumps, torque converters, fluid drives, and stuffing boxes. Graphitar is self-lubricating, mechanically strong, chemically inert, extremely light weight, and practically unaffected by temperature extremes. Graphitar parts may be molded and machined to practically any shape with tolerances as close as .0005" in small sizes. Send us sketches or descriptions of your products and we will show you where Graphitar parts will increase mechanical efficiency and save you money.



pistons

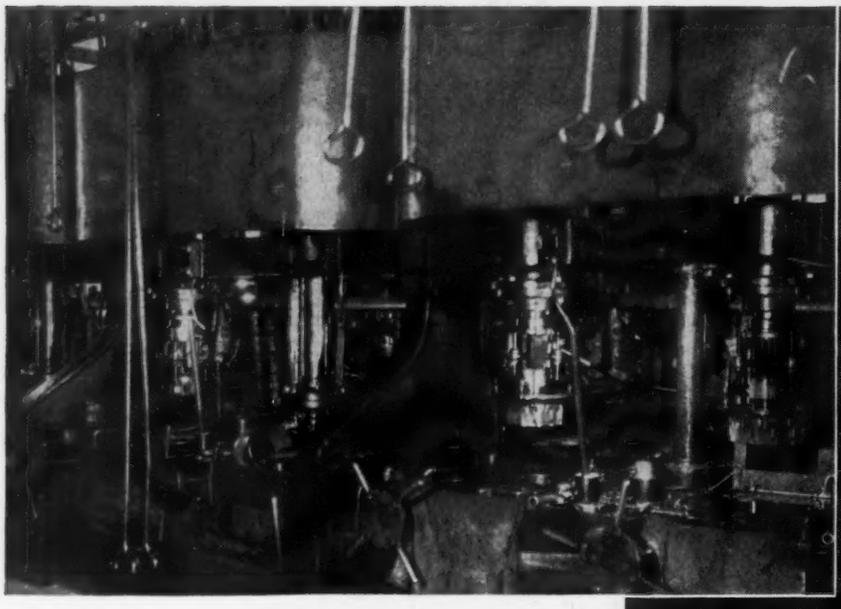


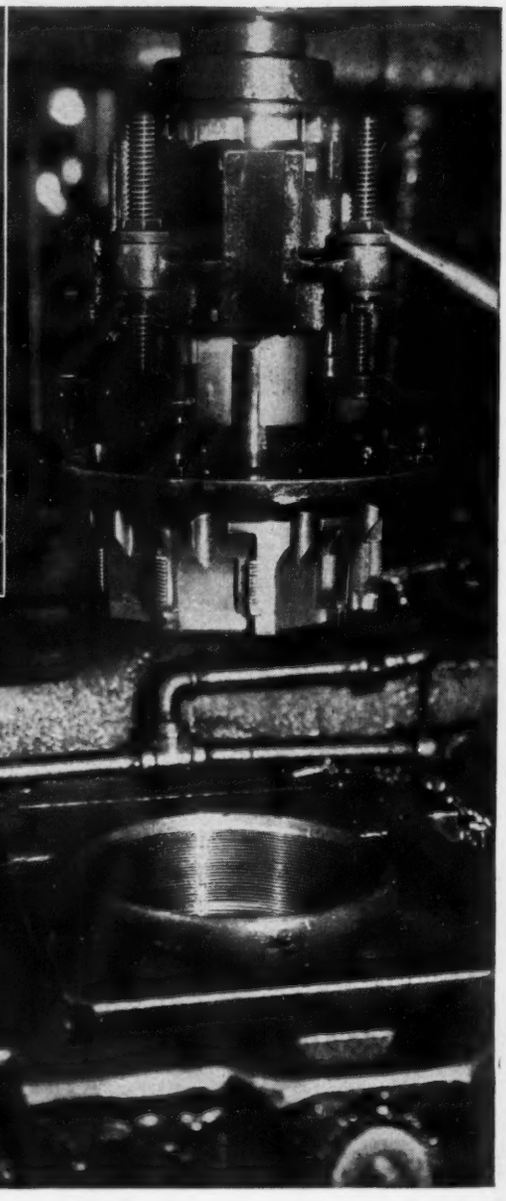
These precision-finished Graphitar pistons without piston rings, operate at speeds up to 6000 strokes per hour in the air-operated drill press built by Snow Manufacturing Co.

graphitar
(CARBON-GRAPHITE)

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

LANDIS Receding Chaser Collapsible Taps Assure Accurately Tapered Threads





Manufacturers of oil well tubular products employ Landis Receding Chaser Collapsible Taps almost exclusively for producing their internal threads. The sturdy, rigid construction, plus the receding chaser feature which withdraws the chasers as the tap advances into the work, and the positive ratchet size adjustments of the LANDIS Receding Chaser Tap, assure tapered threads of unusually fine accuracy. Threads are produced well within A.P.I. tolerance specifications.

Write for descriptive literature covering Landis Receding Chaser Taps.

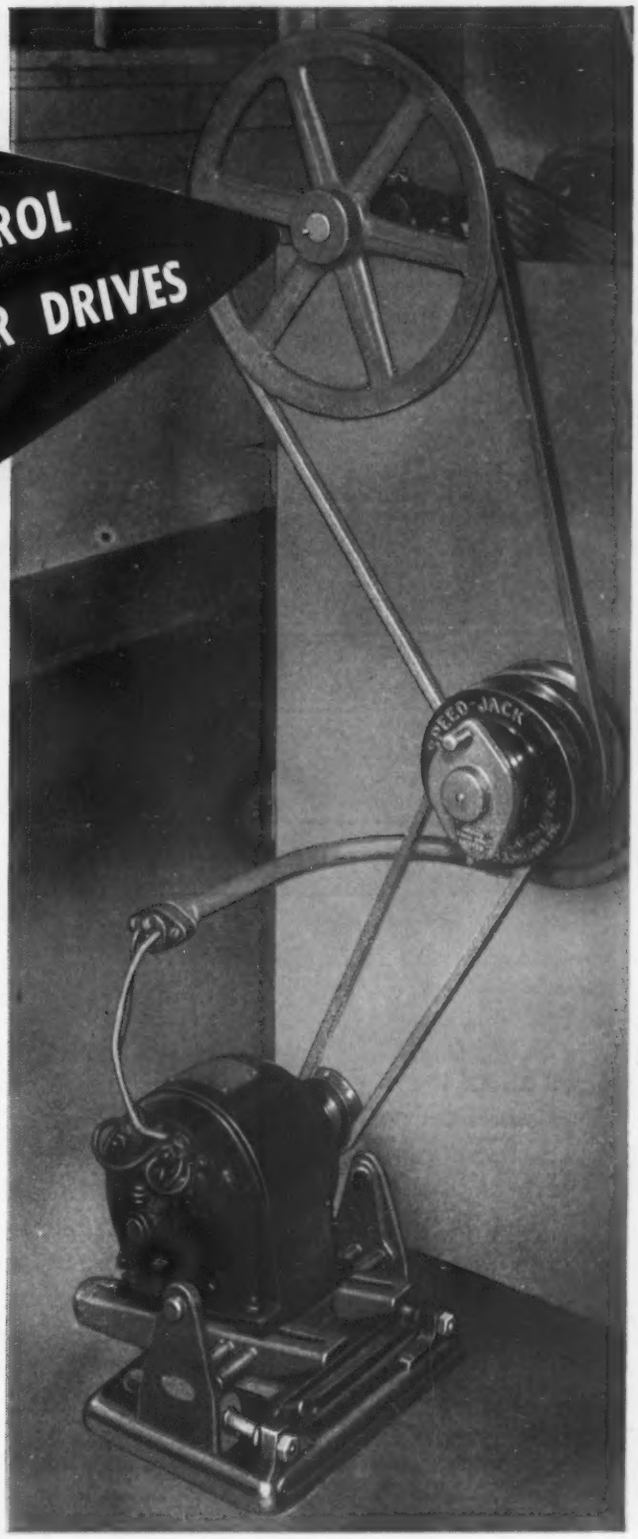
Represented in the Domestic Oil Fields by: Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; C. J. Harter Machinery, Houston, Texas; Frederic-Baker Co., New Orleans, La.; Moore Machinery Co., Los Angeles and San Francisco, Calif.; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

LANDIS MACHINE COMPANY

WAYNESBORO · PENNA · U·S·A·

THREAD CUTTING MACHINES • DIE HEADS • COLLAPSIBLE TAPS • THREAD GRINDERS

HERE'S VARIABLE-SPEED CONTROL FOR FRACTIONAL-HORSEPOWER DRIVES



This new idea in variable-speed control can help you get top product quality on jobs where precise speed is a "must." American Speed-Jack Drives with *"Tailored Speed"* give you smooth *stepless* control of speed through a 3-to-1 ratio. There's no down time for pulley change-over. Your machines with fractional-horsepower drives can now take on jobs previously impossible with fixed or multiple-speed drive limitations. And you get these advantages *plus* quick, easy mounting—horizontally, vertically or *at any angle*—on your machines. Further, this versatile drive is particularly adaptable to remote control. Where your machine set-up requires mounting the unit in a hard-to-get-at position, you can now get *positive* variable-speed control through the use of a compact flexible shaft.

Get more information on how American Speed-Jack Drives can cut costs and boost output on your jobs where quality depends on precise speed. The Speed-Jack Drives Bulletin gives you complete construction details, dimensions and suggested applications. Drop us a line for your copy, now.

How Speed-Jack Drives Give You "Tailored Speed" For Higher Output, Reduced Down Time!

American Speed-Jack Drives enable you to quickly, easily "custom-fit" your machine speed to the individual needs of each job—without interrupting machine operation. Yes, Speed-Jack Drives enable you to actually "tailor" machine speed to job requirements for greater operating efficiency, higher product quality, lower unit costs.

The American Pulley Company

4288 WISSAHICKON AVE., PHILADELPHIA 29, PA.

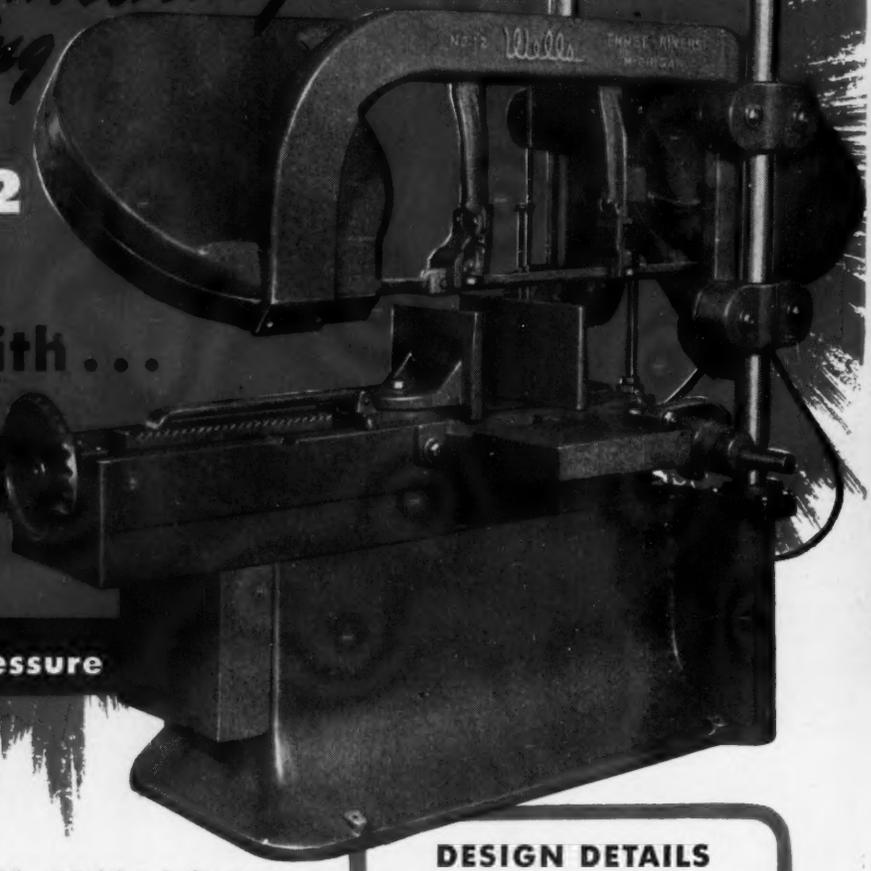
Here's something NEW.. in metal cutting

the WELLS No. 12 horizontal Band Saw with . . .

Automatic Cutting Cycle

and

Controlled Blade Pressure



HERE it is—the new Wells No. 12 Metal Cutting Band Saw with controlled, automatic cutting that reduces operator fatigue, makes better cuts and lengthens blade life. With the new Wells No. 12, just place the stock—bars, rounds, sections or pipe—in the quick-acting vise and push the starting buttons—the machine does the rest. The head comes down automatically, feeding the blade into the stock at a controlled pressure. At the completion of the cut, the head is raised hydraulically to a predetermined position and the motors shut off. Write for complete details and literature.

DESIGN DETAILS

- Heavy duty—suitable for production or general utility.
- Blade is in horizontal position at all times.
- Hydraulic controls for head motion.
- Blade pressure controlled by sensitive micro-switch and solenoid.
- Capacity: rectangular 12″ x 16″; rounds, 12″ Dia.
- Blade: 1″ x .035″ x 13′ 7″
- Speeds: selective, 50, 90 or 150 ft. per min.
- Motors: ¾ H.P. blade motor, ⅓ H.P. hydraulic system motor.
- Weight: approximately 1750 lbs.

Wells SAWS
THE SIGN OF SERVICE

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

like skating on cinders!

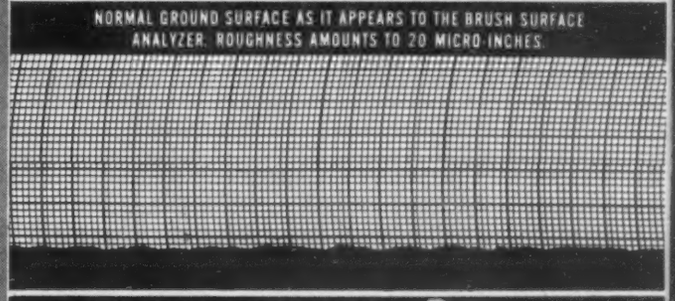
How long could rollers stand this? Not long . . . yet bearings must stand this same kind of punishment with a typical "finished" surface.

There it is, at the right, an actual profile of a normal ground surface as shown by the Brush Surface Analyzer. Look at those ups and downs, and you'll see why bearings wear out before their time.

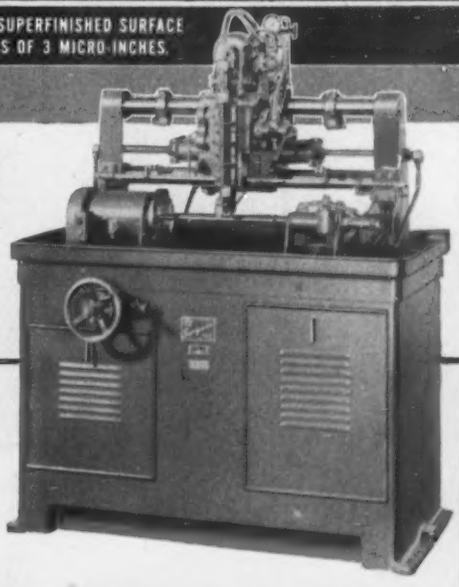
Now look below at the Brush analysis of a *Superfinished* surface. Smooth? Yes, *seven times as smooth* as the usual ground surface! No grinder scratches, no feed spirals, no chatter marks, no fragmented metal.

Without such defects to rupture the protective film of oil, the life of a bearing has no limit. So it pays to know about Superfinishing . . . and Gisholt engineers are ready with the facts.

NORMAL GROUND SURFACE AS IT APPEARS TO THE BRUSH SURFACE ANALYZER. ROUGHNESS AMOUNTS TO 20 MICRO-INCHES.



BRUSH ANALYSIS OF A SUPERFINISHED SURFACE SHOWS A SMOOTHNESS OF 3 MICRO-INCHES.



THE GENERAL PURPOSE SUPERFINISHER is a self-contained unit, simple to operate. Handles a wide variety of miscellaneous or production work. Also available — — specialized machines for all requirements.

GISHOLT MACHINE COMPANY

1245 E. Washington Ave. • Madison 3, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of leading specialists in the machining, surface finishing, and balancing of round or semi-round parts. Your problems are welcomed here.

FOR FASTER PRODUCTION—

Weld Lighter Steels with Larger Electrodes

use...

P&H

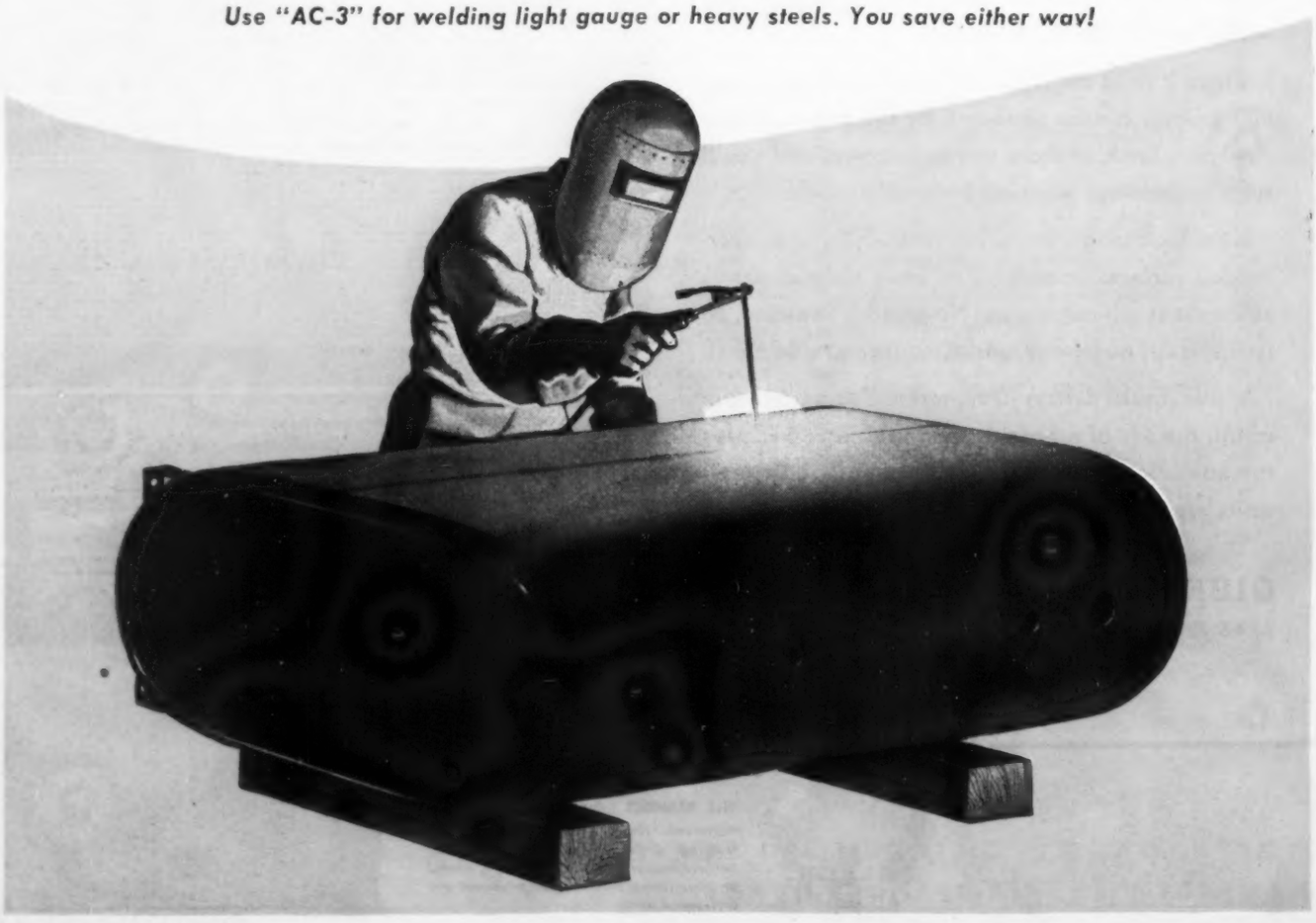
"AC-3"

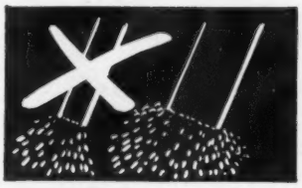
(Class AWS-ASTM E6013)

Here's a P&H Electrode that pays big dividends—because it can be used in the larger sizes on thinner steels. With it, you deposit more metal for faster welds. Therefore, costs go down; production goes up.

"AC-3" is extremely easy to handle—has a unique "spray-type" arc of medium penetration that eliminates thin gauge "blow throughs." It lays in smooth, flat beads — has an easy-to-remove slag that virtually "curls off." For AC or DC welding, "AC-3" holds distortion and under-cutting to an absolute minimum, for more important savings in time.

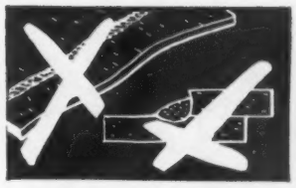
Use "AC-3" for welding light gauge or heavy steels. You save either way!





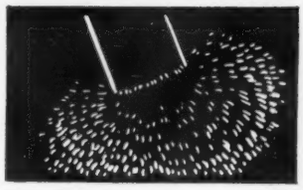
LARGER ELECTRODES MEAN LOWER COSTS

You get faster deposition with "AC-3" because you use a larger size to weld lighter steels. Try it and prove to yourself the real savings this P&H Electrode makes possible.



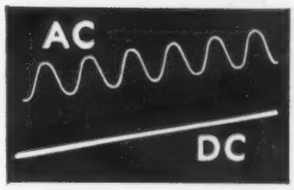
CUTS DISTORTION AND UNDER-CUTTING

Yes, "AC-3" minimizes these troubles to save more time, prevent waste. "AC-3" is a general-purpose P&H electrode for welding both thin and heavy steels.



SPRAY-TYPE ARC

With this "spray-type" electrode, tiny particles of metal diffusing across the arc, produce smooth, flat deposits. Finishing is reduced to a minimum or eliminated.



FOR AC OR DC

This P&H Electrode was designed for easy welding on both AC and DC current. So whatever your machines, whatever your work, "AC-3" can speed up welding and lower costs.

SLAG REMOVAL IS NO PROBLEM

Another fine characteristic of "AC-3" is its unusual slag — it virtually "curls off." Think what this means; no extensive time-taking chipping or cleaning operations.

P&H

WELDING ELECTRODES

4411 W. National Avenue

Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

TRY THESE P&H ELECTRODES

Whatever your requirements, you will find the proper type and size electrode in the complete P&H line. These are but a few of the mild steel group. Others for welding all stainless steels, cast iron and for hard surfacing.

Preview!

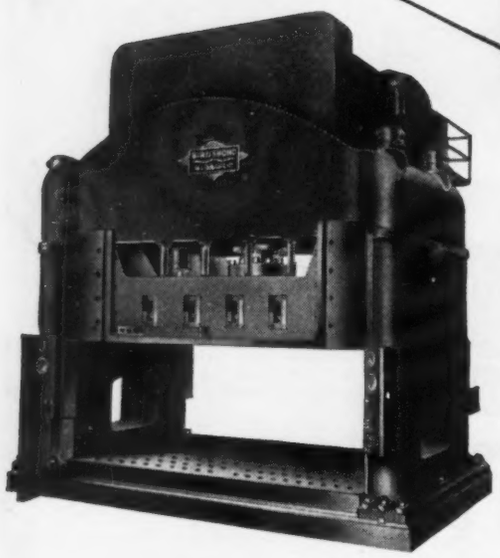
NEW P&H AC ARC WELDER

Absolutely No Moving Parts

First announcement of world's most advanced AC arc welder. This entirely new P&H machine is without a moving part. No sliding cores — nothing to require maintenance. New kind of positive, creep-proof control. Write for advance information!

AMERICA'S MOST COMPLETE WELDING SERVICE

BIRDSBORO
HYDRAULIC

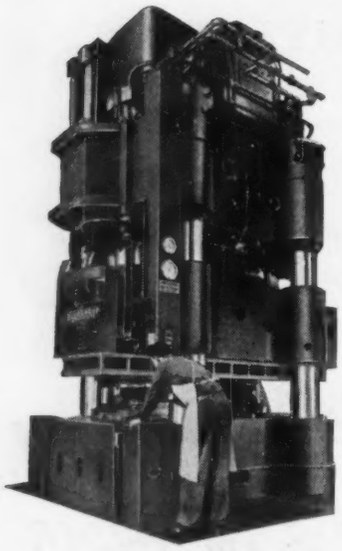


HYDRAULIC PRESSES

Engineered by

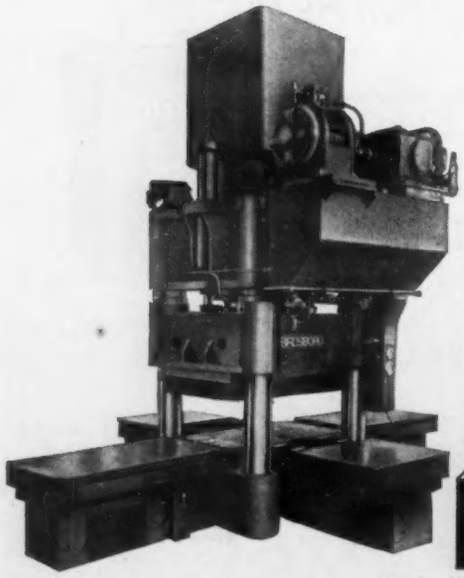
BIRDSBORO

PROVIDE DEPENDABLE LOW-COST PRODUCTION



● Birdsboro's engineers have had broad experience in designing and building hydraulic presses for every type of metal working operation involving the use of pressure.

The accompanying list indicates some of the many operations being performed by Birdsboro Hydraulic Presses. If your production calls for the use of presses, Birdsboro engineers will be glad to work with you in designing and building just the type and size of press best suited to give you dependable, low-cost production.



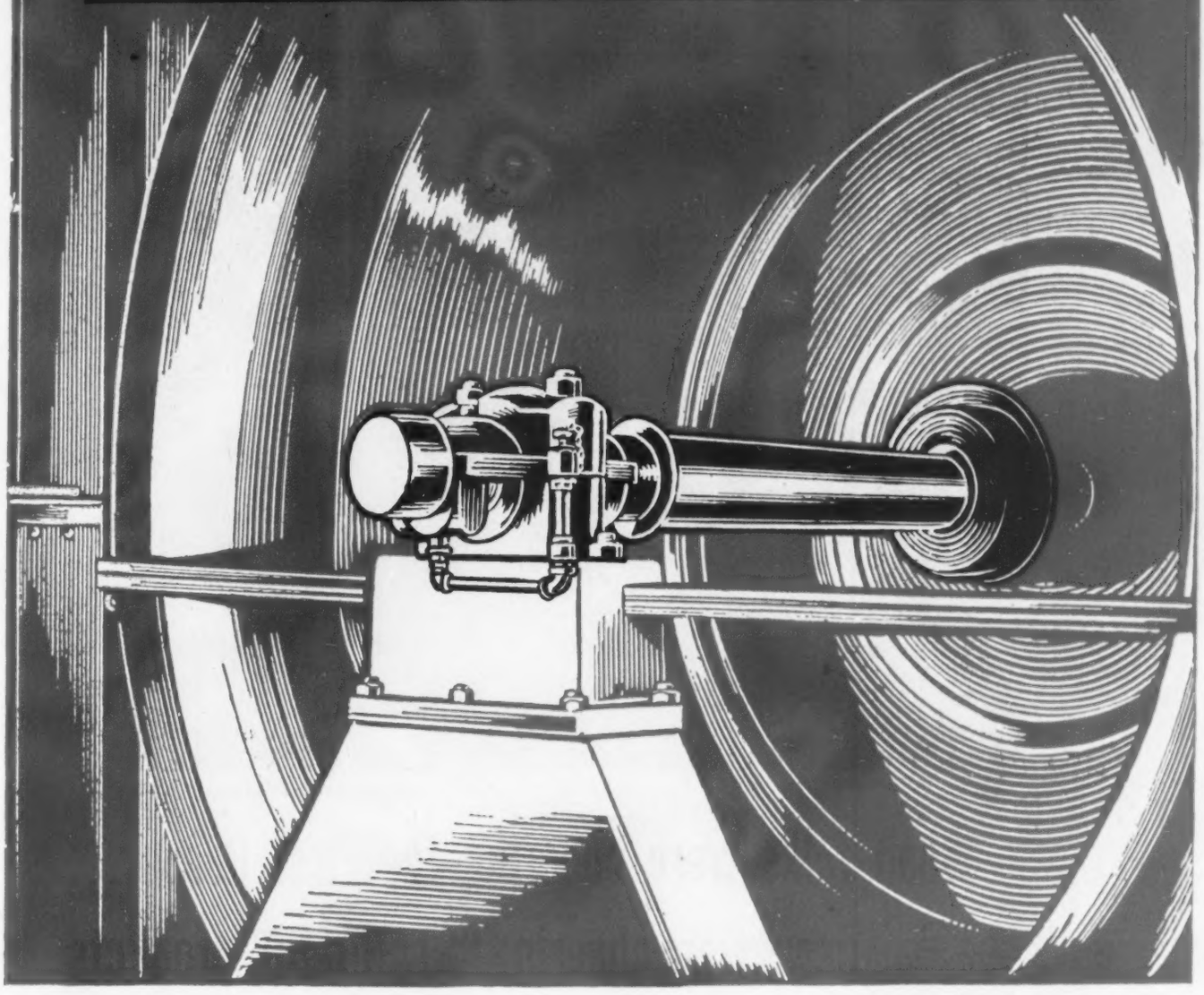
Stamping
Forming
Forming by Guerin process (rubber pad)
Drawing (Single, double and triple action)
Coining
Bulging (expanding hydraulically)
Dishing
Crimping
Bending and straightening (of structural shapes, plates, weldments, steel castings, etc.)
Flanging
Joggling
Piercing
Shell forging and drawing
Pipe bending
Riveting
Scrap crushing
Lead extrusion (cable covering)

BUILDERS OF: Hydraulic Presses - Steel Mill Equipment - Rolls - Special Machinery - Crushing Machinery

Birdsboro Steel Foundry & Machine Co. • Birdsboro, Pa.

BIRDSBORO
HYDRAULIC PRESSES

"BEARINGS RUN 10% COOLER



since changing to Tycol industrial greases

TYCOL
INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C.
Pittsburgh • Philadelphia

TIDE WATER ASSOCIATED OIL COMPANY

"Production speeded 65%...
Repair costs slashed 30%...
Deposits eliminated...
Highly stable...
Consumption cut 25%..."

This report from a plant engineer typifies the kind of trouble-free, cost-cutting lubrication provided by Tycol Industrial greases. They contain more high-grade cylinder oil—less soap—which means better performance in every application.

For aid in the selection of Tycol greases best suited for your particular needs, contact your nearest Tide Water Associated office today.

LUBRICATION—"ENGINEERED TO FIT THE JOB"

MILESTONES IN AMERICAN INDUSTRIAL DEVELOPMENT

ILLUSTRATION FROM THE BETTMAN ARCHIVES

When folks were cheering the First Reaper...

users were cheering "STANDARD" products

When Cyrus Hall McCormick's clumsy reaper clattered about the wheat field at Steel's Tavern in July, 1831, it opened a new era in industrial and agricultural development. McCormick's father had tried and failed to perfect a machine to cut wheat. The son thought out the principles that underlie the modern reaper, and when only twenty-two, completed the first successful model, which converted the skeptical farmer audience into a cheering group of enthusiasts.

"Standard" had already been serving American industry for 36 years when the reaper was born. Blooms and bar stock were its products then . . . today the list includes a variety of forgings and castings: pressed steel blooms, billets and die blocks, forged steel shafts, industrial, marine and locomotive forgings, steel castings of all descriptions, springs—elliptic and helical—steel tires, flanges, rings, wheels, and gear and pinion blanks.

To assure highest quality, Standard produces steel in its own open hearth furnaces, so that all operations from melting to shipping are under direct control. To simplify your forging and casting supply problems, why not "Standardize on Standard." The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham, Seattle.

STANDARD STEEL WORKS DIVISION

BLW THE BALDWIN GROUP

BALDWIN

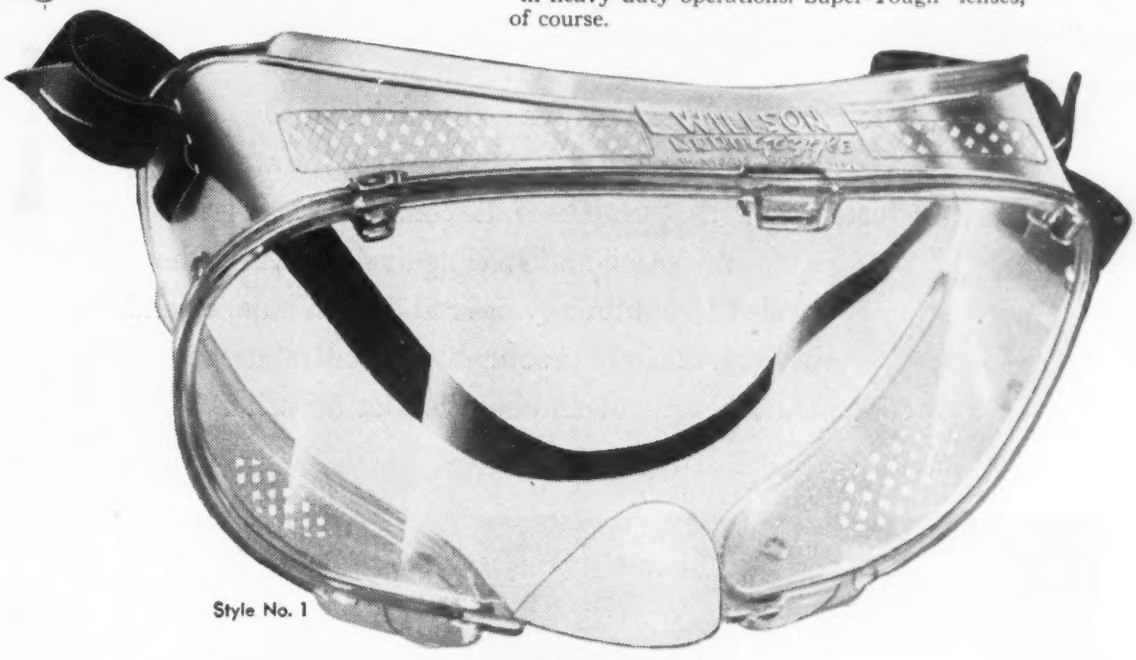
FORGINGS AND CASTINGS

Add Comfort to Your Safety Program

. . . get WILLSON

Style F350

COMFORT IS IN THE SADDLE . . . With this broad saddle nose bridge, there's less fatigue in wearing these goggles over long periods of time in heavy duty operations. Super-Tough* lenses, of course.



Style No. 1

AN OUNCE AND A QUARTER OF PREVENTION . . . Lightweight, form fitting MONOGoggle can be worn all day with comfort. Tru-Hue green or clear plastic full vision interchangeable lens has high impact strength.

Style No. 45D

THIS LIGHTWEIGHT TAKES ON ALL DUSTS . . . Large throw-away filter and flexible molded face piece assure easy breathing and comfortable, snug, face fit. U. S. Bureau of Mines Approved.

*Reg. U. S. Pat. Off.

For complete information on these products and their application, as well as many more eye and respiratory protective devices, get in touch with your nearest Willson distributor or write us direct.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON

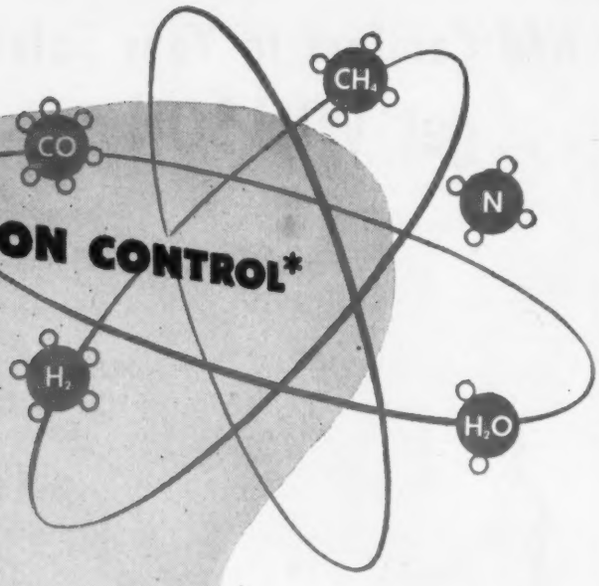
PRODUCTS INCORPORATED

READING, PA., U. S. A. *Established 1870*

233 WASHINGTON STREET, READING, PA., U. S. A.

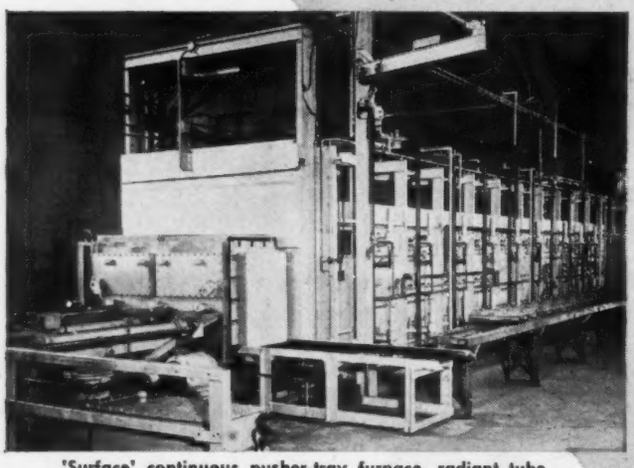
CARBON CONCENTRATION CONTROL*

a new achievement in gas chemistry



A significant contribution to the practice of continuous gas carburizing has been made by recent 'Surface' research and its practical application is now available to industry.

The process proves that the composition of the carburizing gas is a function of the steel being carburized; that in spite of the complexities of gas composition and steel analysis, both can be controlled to obtain any desired carbon balance and that it is entirely practicable to control carbon concentration without undesirable soot deposits.



'Surface' continuous pusher-tray furnace, radiant tube heated, used in the process of carbon restoration control.

If you have a problem in continuous gas carburizing, write for a copy of "Carbon Concentration Control".

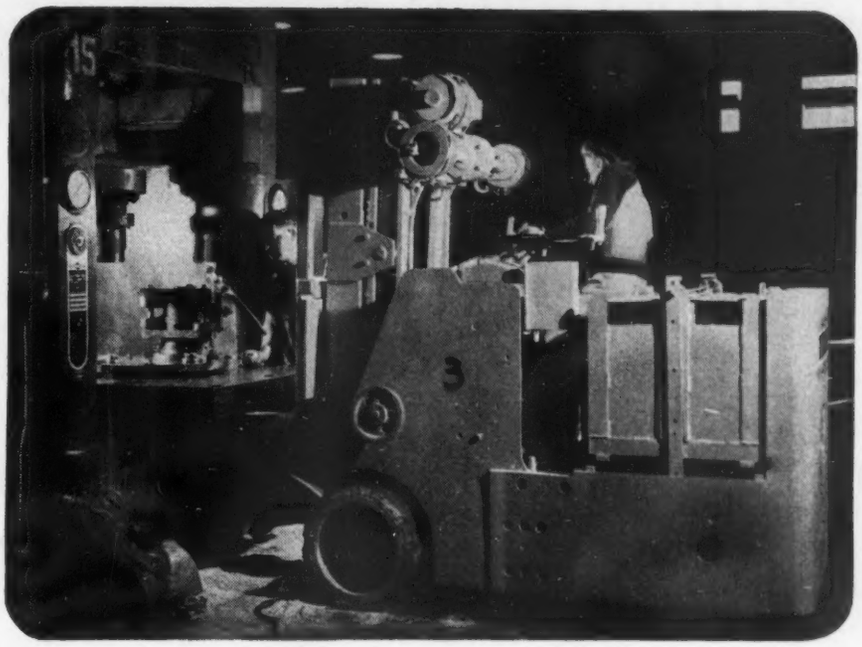
Carbon Restoration, Dry Cyaniding, Gas Carburizing, Clean Hardening.

'Surface'

SPECIAL RADIANT-TUBE HEATED, ATMOSPHERE FURNACES FOR:
Gas Carburizing and Carbon Restoration (Skin Recovery), Clean and Bright Atmosphere Hardening, Bright Gas-Normalizing and Annealing, Dry (Gas) Cyaniding, Bright Super-Fast Gas Quenching, Atmosphere Malleableizing, Atmosphere Forging, and Specific Effects upon Metal Surfaces.

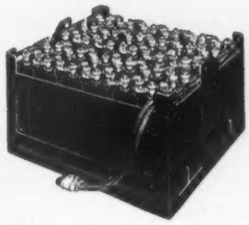
SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

Handling Work is **STOP** *and* GO



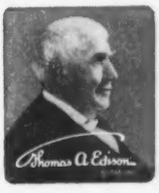
and Needs Instant-On-Off Power

In replacing a loaded skid box with an empty beside a machine, an industrial truck will make an average of approximately 14 moves forward, backward, up and down. A battery industrial truck has a natural advantage in this kind of stop-and-go service because it gets the necessary surges of power instantly from its battery, yet consumes no power during the stops. Thus it is not only economical of power, but the electricity used for charging its batteries is low-cost power.



Its electric-motor drive operates quietly, without vibration, and thus with well-nigh negligible repair requirements. With batteries exchanged two or three times per 24 hour day, it is continuously supplied with power and, since one battery is charged while the other works, the truck need not stop work for servicing of its power unit.

For 24 hour-a-day material-handling work, therefore, a battery industrial truck is an inherently dependable and economical machine, especially when powered by EDISON Nickel-Iron-Alkaline batteries. With steel cell construction, a solution that is a natural preservative of steel, and a foolproof electrochemical principle of operation, they are the longest-lived, most durable, and most trouble-free batteries. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey.* In Canada: *International Equipment Company Limited, Montreal and Toronto.*



EDISON

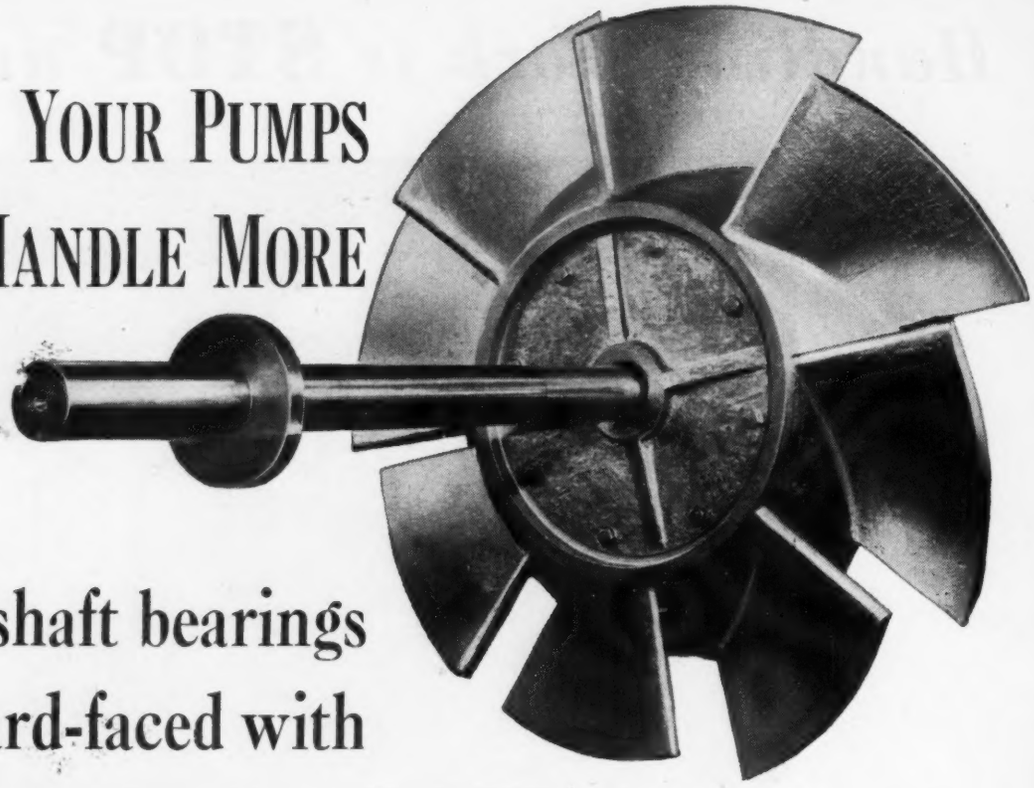
Nickel • Iron • Alkaline

STORAGE BATTERIES

In Industrial Trucks, EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages.

1. They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel. 2. They can be **charged rapidly;** gassing cannot dislodge the active materials. 3. They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place. 4. They are **simple and easy to maintain.** 5. They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling. 6. They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.

YOUR PUMPS CAN HANDLE MORE



when shaft bearings are hard-faced with HAYNES STELLITE Alloy

The bearing surfaces on the shaft of this caustic soda pump were hard-faced with HAYNES STELLITE alloy No. 6. It is run at 900 r.p.m., to handle 135,000 gallons per hour . . . and it stays in service.

Protect the shaft bearings on your pumps with a welded-on layer of HAYNES hard-facing rods, and you can run them faster . . . thus increasing their hourly capacity. Because HAYNES alloys stay hard and wear-resistant—even at red heat—the hard-faced surfaces will stand up indefinitely, with no appreciable down time for replacement and repairs.

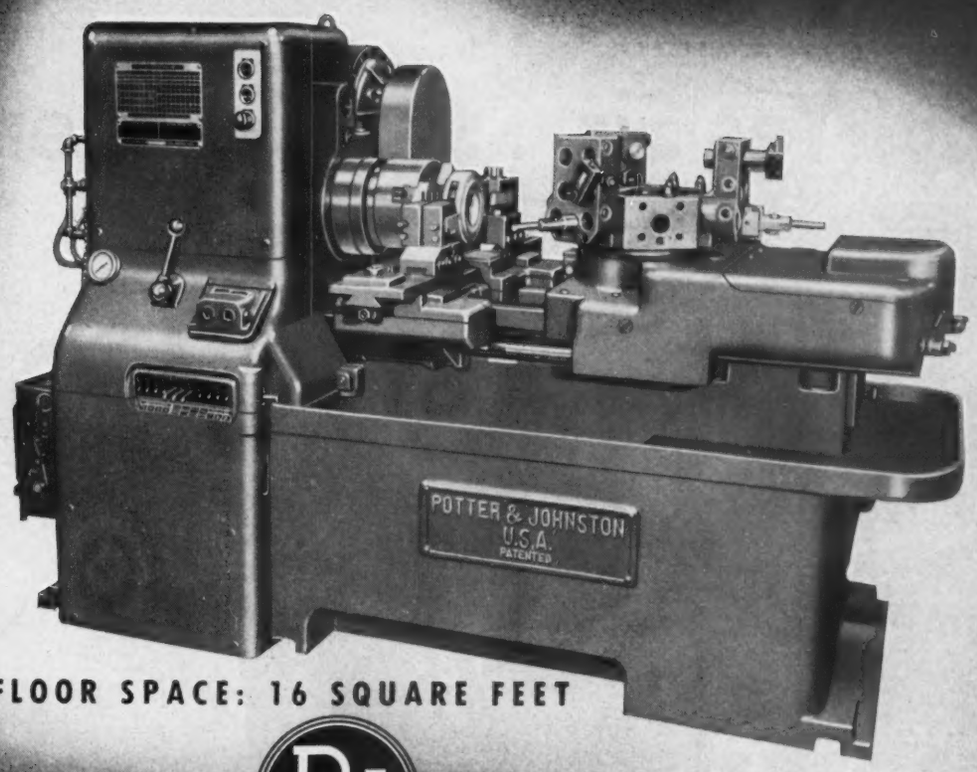
Metal surfaces that are in contact with the hard-faced deposit will resist wear for longer periods of time, too, because HAYNES STELLITE alloys take a high polish and have an extremely low coefficient of friction. This means less abrasion and less friction heat between the rubbing surfaces.

There is a HAYNES rod to meet almost any condition of wear, abrasion, heat, or corrosion. Write for the 104-page booklet "Hard-Facing With Haynes Stellite Products"—Form 2254—and see for yourself how these materials increase efficiency of your equipment, not only in pumps, but in any parts that require replacement because of wear. For engineering assistance, write or telephone our nearest district office.

The registered trade-marks "Haynes," and "Haynes Stellite," distinguish products of Haynes Stellite Company.

Haynes Stellite Company
Unit of Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Chicago—Cleveland—Detroit—Houston
Los Angeles—New York—San Francisco—Tulsa

HAYNES alloys
TRADE-MARK



FLOOR SPACE: 16 SQUARE FEET

Built into this 3-U Automatic Turret Lathe is the power & high speed demanded by carbide tooling

This latest addition to the P. & J. line of automatics for profitable production weighs only 5,200 lbs., boxed for shipment, yet it has the power, high speed, strength and rigidity required for carbide tooling. Its relatively small size and streamline design makes cleaning a simple task—and this is important in "plant housekeeping". As the machine has a constant speed drive, the motor application is very simple. The motor is mounted on a base at the rear of the headstock and a silent chain connection is employed. There are 48 changes of speed between 36-711 RPM and 73-1445 RPM. These speeds are arranged in six sets of four automatic changes. Multiple disc clutches are used for the speed changes. Strength is imparted to the machine by its sturdy construction. The ways are solid blocks of steel tongued to the base, clamped into position and ground in place. This results in permanency of alignment, freedom from scoring, and long life.

GENERAL DIMENSIONS

Swing over cross slide	8¾" Dia.
Travel of cross slide-each way	2½"
Number of turret faces	6
Diameter of hole in turret	1½"
Depth of holes in turret	Through
Distance from center of turret hole to top of turret slide	2⅞"
Total turret slide travel	6"
Turret Feed	4½"
Spindle Adjustment	3"
Cross slide adjustment	None
Diameter of hole through spindle	1½"
Horsepower required to drive	5
Net Weight	5,000
Gross weight, boxed for sea shipment	5,600
Dimensions of Case	7' 11" x 3' 9" x 4' 3"
Cubic Contents	126 cu. ft.

POTTER & JOHNSTON MACHINE COMPANY

PAWTUCKET, RHODE ISLAND

Yes Sir, . . . here's

UNITED STATES

alloy steel in *ANY form your heart desires!*

...and in ANY analysis...in ANY heat treatment ...in ANY size...and to HIGHEST quality standards

THAT seems like a pretty big order. But we are prepared to fill it. Because we are completely equipped to meet ALL your alloy steel requirements.

• If you need forging ingots, blooms, billets or slabs . . . square bars, round bars, coiled bars, spring flats or special sections . . . plates, sheet, strip, sketch plates or structural shapes—

• If you use bearing steels, aircraft steels, gear steels . . . Nitralloy steels . . . regular or special analysis alloys—

• If the steel must be quenched and tempered . . . regular or spheroidized annealed . . . normalized . . . stress relieved or tempered . . . or needs other special heat treatments—

• If you want it hot rolled . . . in straight lengths or coiled . . . machine or gag straightened . . . flattened . . . machine, cracker or torch cut . . . pickled . . . sand blasted, oiled or limed—

Whatever your specifications call for—we can provide.

• • •

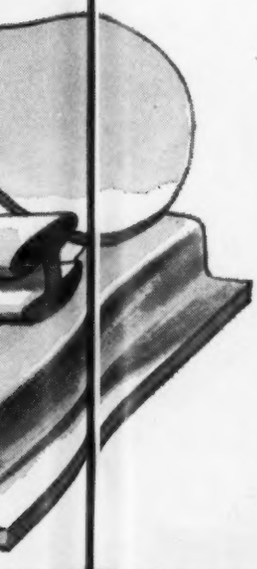
Complete alloy steel producing and finishing facilities, both in Pittsburgh and Chicago, make it possible to expedite deliveries—to reduce shipping time and cost—to give you not only the finest alloy steel produced, but exactly as you want it, no matter where you are located.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

7-708



Did you know?

...That no other single producer can offer, or equal, Carnegie-Illinois Steel Corporation's versatility *of alloy steel production.*

...That much of the major contribution Carnegie-Illinois was able to make in the development of the National Emergency Steels was based on the valuable research previously done in our laboratories—notably in the field of hardenability.

...That Carnegie-Illinois added new electric furnace plants in both Pittsburgh and Chicago districts to produce qualities suitable for aircraft engine parts as well as large quantities of bars for aircraft tubing and anti-friction bearings.

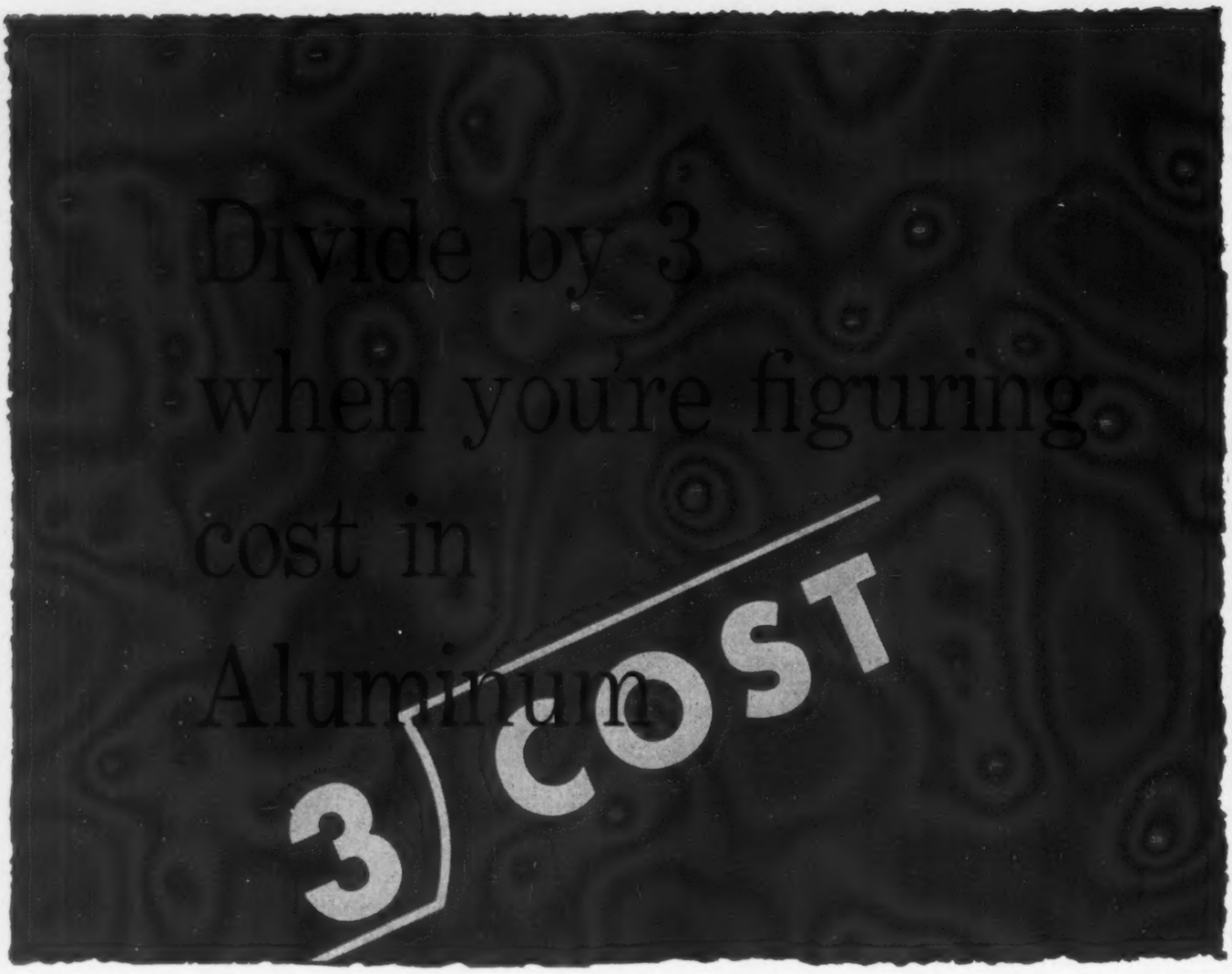
U·S·S Carilloy Steels

USS STEEL — UNITED STATES STEEL

ELECTRIC FURNACE OR OPEN HEARTH

COMPLETE PRODUCTION FACILITIES IN CHICAGO AND PITTSBURGH

STEEL



You get three times as many parts from a pound of Alcoa Aluminum Screw Machine Stock as from a pound of brass or steel. So, when you're comparing stock costs divide the price of aluminum by *three*. Makes the price of aluminum even more interesting.

Do you know about Alcoa 11S-T3... the aluminum alloy specially developed for automatic screw machine use? You can feed it fast, run it fast, and it's free-cutting.

Ask us for the book "Alcoa Aluminum in Automatic Screw Machines". ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in leading cities.

MORE people want MORE aluminum for MORE uses than ever

ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

lower cost per piece
with this machining
method . . .
Surface broaching is a modern machining method that in many cases shows reduced costs through higher production, finish to closer tolerance, and low tool maintenance costs. If you machine large quantities of duplicate parts we will be glad to work with you on the possibility of adopting Footburt Surface Broaching Machines. Send us blueprints and hourly production requirements for our recommendations.
THE FOOTE-BURT COMPANY
CLEVELAND 8, OHIO
Detroit Office · General Motors Building
FOOTBURT
Surface Broaching
FOOTBURT PATENTED TOOTH FORM

A name - -

and a promise

Hanson-Van Winkle-Munning believes in a stabilized price structure. On behalf of our customers and ourselves we are operating on a firm price basis.

In the belief that decreased prices will benefit the industry and lead to increased developments and future expansion, Hanson-Van Winkle-Munning promises to hold prices wherever possible; reduce prices as production costs warrant; cooperate fully toward the economic good of the industry and the country.

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing equipment and supplies

PLANTS: **MATAWAN, NEW JERSEY • ANDERSON, INDIANA**

SALES OFFICES: ANDERSON • CHICAGO • CLEVELAND • DAYTON • DETROIT • GRAND RAPIDS MATAWAN • MILWAUKEE • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER SPRINGFIELD (MASS.) • STRATFORD (CONN.) • SYRACUSE

2441

DoALL
REG. U. S. PAT. OFF.

Faster Machining

Precision and high-speed sawing of all materials, metals, woods, plastics. Saw sizes and accessories to suit all requirements.

CONTOUR SAWING MACHINE

TOOLMAKERS' LATHE

ONE SOURCE SAVES YOU TIME AND EFFORT

DoALL Products *Include:*

- **CONTOUR SAWS:** 13 models; all prices. Low and high speeds, step or variable. Precision or high-speed cutting.
- **BAND SAW BLADES:** Razor-sharp, superhard teeth. No resharpening needed.
- **BAND FILING MACHINES:** 9 times faster than hand filing, 4 times faster than jig filing.
- **JIG FILING MACHINES:** For more intricate work. Perfectly straight filing.
- **FILES:** All kinds — file bands, jig files, rotary files, hand files.
- **SURFACE GRINDERS:** 6 models. Hydraulic, precision type for toolrooms and production. Also grinding wheels, magnetic chucks, cutting oils, coolant systems, dust collectors, etc.
- **SPOT WELDERS:** New "True-Pressure" type having straight up-and-down movement. No tip skidding.
- **HEAT-TREATING UNITS:** Compact, combination unit includes furnace, oven, quench tanks, automatic controls.
- **ELECTRONIC INSPECTION:** Automatic inspection, sorting and counting of small parts, twice as fast as manual methods.
- **BENCH PROFILERS:** For great variety of small work—profiling, milling, slotting, routing, etc.
- **PRECISION LATHES AND HAND SCREW MACHINES:** Various types for toolroom and production lines.
- **RADIUS SHAPER-MILLER:** 1 setup for many operations—has a thousand production uses.
- **VARIABLE SPEED DRIVES:** Smooth speed-changing drives. Infinitely variable.
- **GAGE BLOCKS AND INSPECTION INSTRUMENTS:** The finest for precision work.
- **TOOL-AND-DIE STEEL:** Non-warping, precision-ground up to 1 inch thick and 6 inches wide.

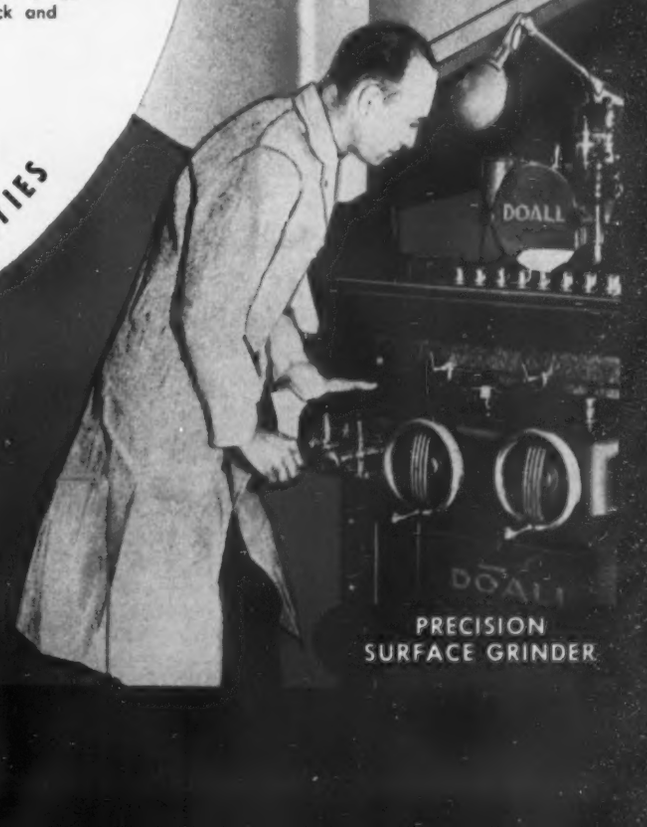
The DoALL *Company*
Reg. U. S. Pat. Off.

REPRESENTATIVES IN 56 COUNTRIES

Cable Address: DoALL, Des Plaines

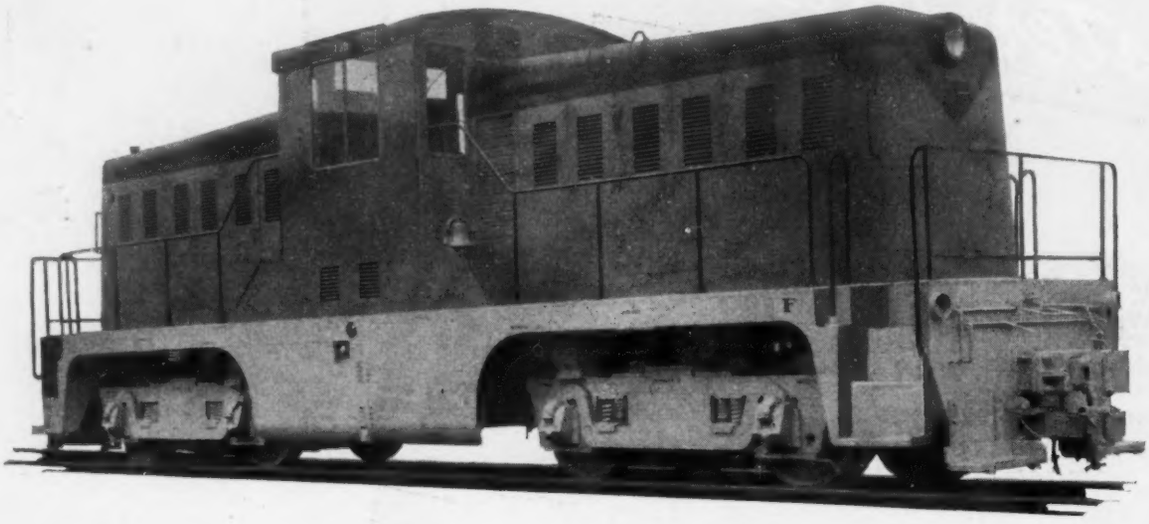
Des Plaines, Illinois

DoALL SALES AND SERVICE STORES IN KEY CITIES



PRECISION SURFACE GRINDER

Send for free pictorial booklet "DoALL EQUALS TEN PLUS" which compares fast, efficient Contour Machining with other metal-cutting processes. Shows how this miracle method of low-cost production makes great economies.



A MATTER OF PERCENTAGES

Your new Whitcomb locomotive will be available for service near 100% of every 24 hours. The average is between 92% and 98%—THAT'S HIGH.

Your new Whitcomb will show a substantial decrease in operating and maintenance costs, around 50% less than the displaced steam job—THAT'S LOW.

Your new Whitcomb will be dependable 100% of the time, executing the toughest switching and hauling assignments quickly and efficiently—THAT'S GOOD.

And, if you will consult with Whitcomb engineers and place your haulage problem before them, they will recommend the locomotive best suited to your specific needs. Not too big or too powerful a locomotive, that would be extravagantly expensive to operate and maintain, nor one that is too small with too little power that couldn't possibly do what you expect of it, but one *THAT'S JUST RIGHT!*

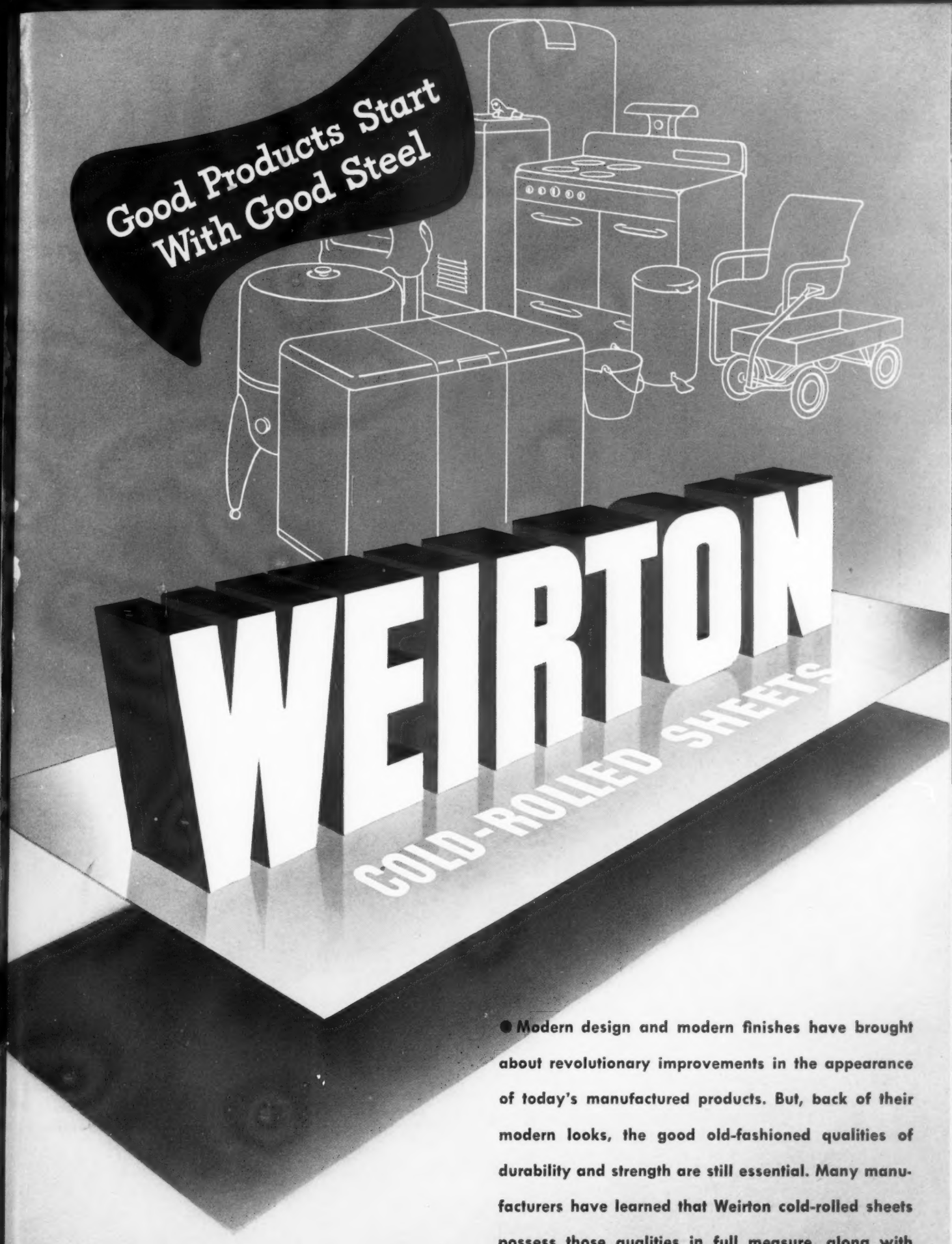
DIESEL ELECTRIC LOCOMOTIVES 25 TO 95 TONS
DIESEL MECHANICAL LOCOMOTIVES 3 TO 30 TONS

BLW
THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS



● Modern design and modern finishes have brought about revolutionary improvements in the appearance of today's manufactured products. But, back of their modern looks, the good old-fashioned qualities of durability and strength are still essential. Many manufacturers have learned that Weirton cold-rolled sheets possess those qualities in full measure, along with exceptional drawing and forming qualities that speed production and reduce tool expense and scrap losses.

WEIRTON STEEL CO.

WEIRTON, W. VA. *Sales Offices in Principal Cities*

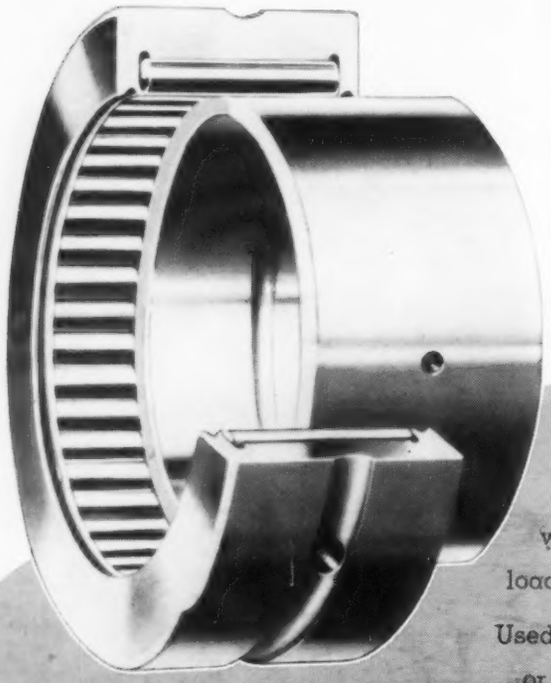
WEIRTON STEEL COMPANY

Division of **NATIONAL STEEL CORPORATION** *Executive Offices, Pittsburgh, Pa.*

McGILL PRECISION BEARINGS

provide smooth action and dependability in

OILGEAR FLUID POWER PUMPS AND MOTORS



The "SOLIDEND" *MULTIROL* BEARINGS used in OILGEAR FLUID POWER PUMPS and motors are working proof of McGILL balanced design . . . high load capacity . . . and precision dependability.

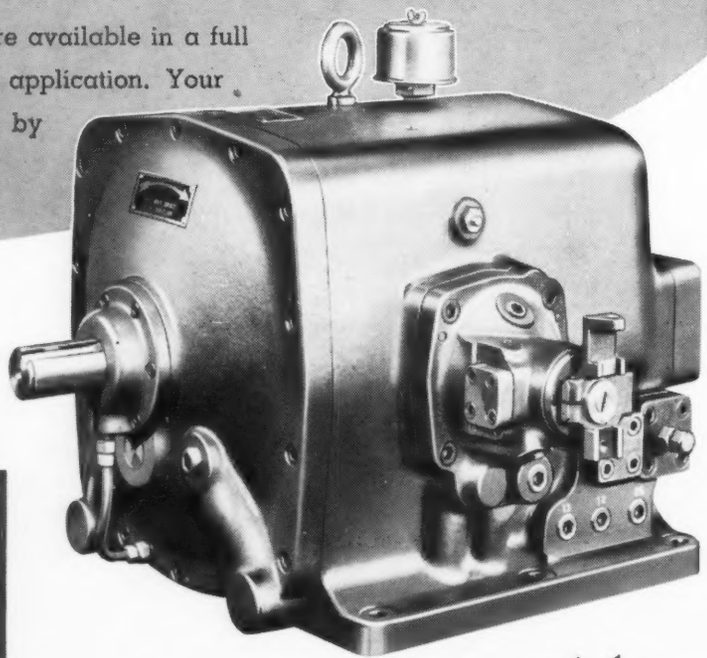
Used to convert rotary motion into stepless variable linear or rotary motion for accurate control of machine function.

OILGEAR PUMPS depend on McGILL precision for smoother, quieter and longer operation.

The ease with which OILGEAR PUMPS operate machine tools, presses, and processing machines is due in part to the high load capacity of McGILL "SOLIDEND" design . . . with its greater effective roller length and solid outer race and roller-retaining end shoulders.

The longer life of "SOLIDEND" *MULTIROL* BEARINGS, due to their rigid construction and adequate lubrication facilities (lubrication in our unit is automatic), lends to the OILGEAR PUMP a high degree of stamina . . . a minimum of maintenance.

"SOLIDEND" *MULTIROL* BEARINGS are available in a full range of standard sizes to suit any application. Your special problems are welcomed by McGILL engineers.



McGILL precision bearings

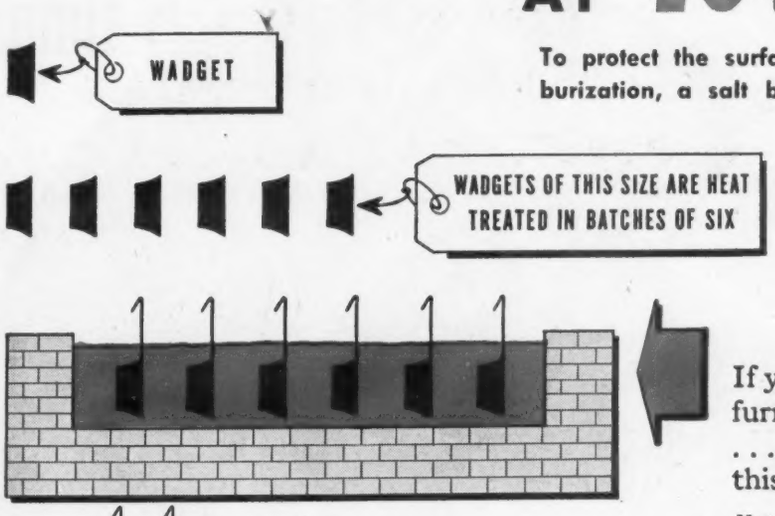
For complete information write today for bulletin SM-42: McGill Mfg. Company, Inc., 401 N. Lafayette St., Valparaiso, Ind.

McGill Selected for

• LONG LIFE • SMOOTH ACTION • DEPENDABILITY

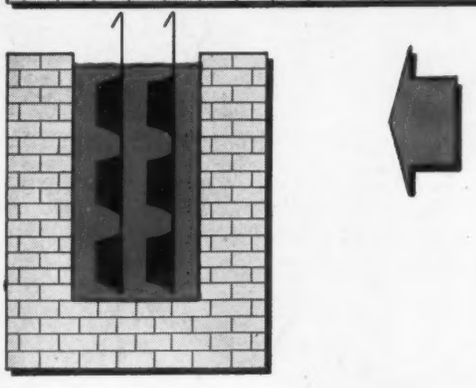
HOW TO HEAT TREAT A WADGET* AT LOWEST COST

To protect the surface, avoid distortion, eliminate decarburization, a salt bath furnace will, of course, be used



If you get a *conventional* salt bath furnace it looks somewhat like this . . . and the Wadgets are placed like this.

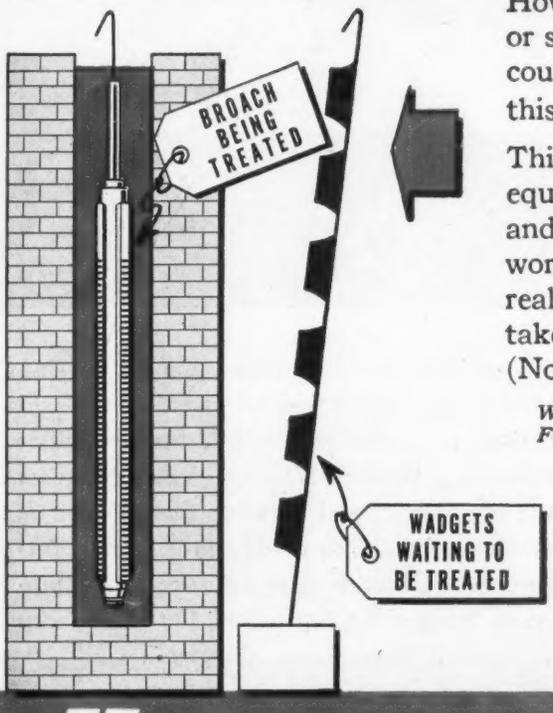
Note the surface area exposed†



If you have an *Upton* Electric Salt Bath Furnace it would probably look like this . . . with the Wadgets being placed like this.

Note surface area exposed†

†Surface radiation losses equal 15 KW per sq. ft. per hour.



However, if you also wanted to treat a broach or some similar long piece of work, then you could use an Upton Furnace that looked like this.

This saves more heat (and more power), does equally good work, takes less time loading and unloading, but some people think it won't work; that it's too deep. So, until they do realize that Upton Furnaces can be built to take any length work, the other furnace (No. 2) is usually supplied.

Why don't you send for more information on Upton Furnaces? Send us the dimensions of your *Wadgets.*

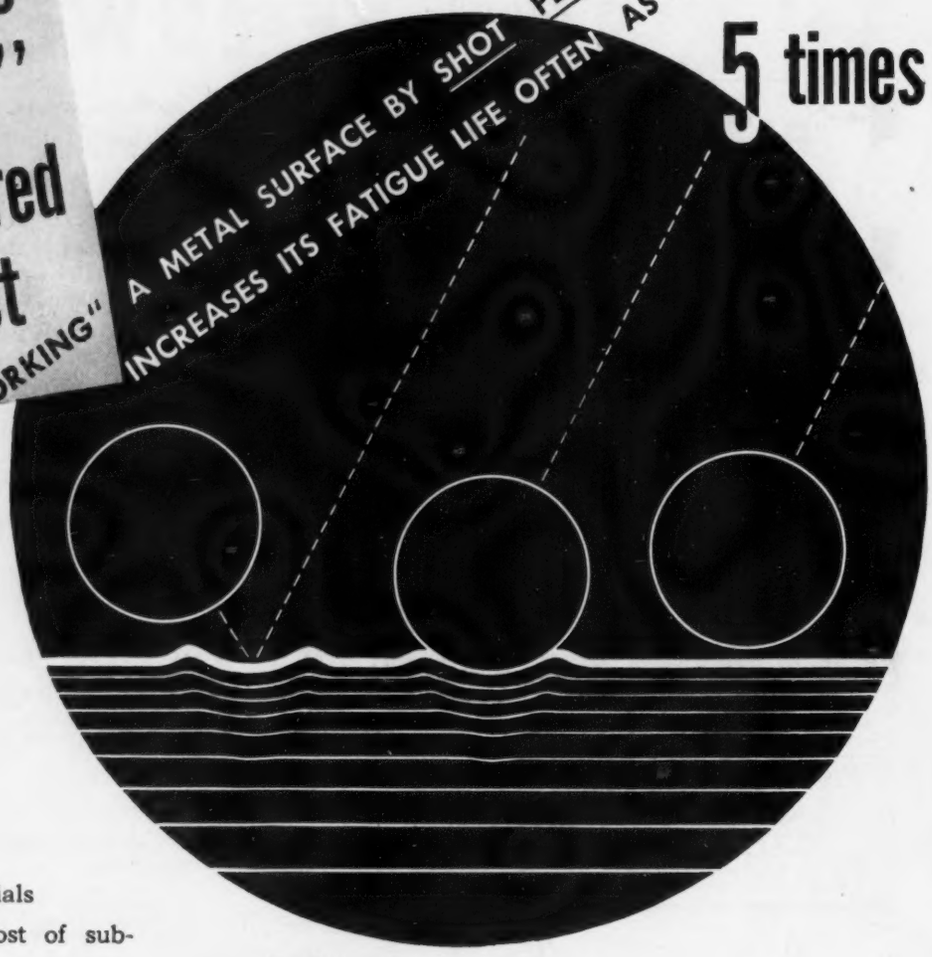
* Wadget: A piece of work that you are wondering how to treat for better results and at lower cost than at present which will eventually be heat treated in an Upton Electric Salt Bath Furnace because there is no known size or shape that cannot conceivably be treated in an Upton Electric Salt Bath Furnace

Upton ELECTRIC FURNACE DIV.

7455 MELVILLE AT GREEN • DETROIT 17, MICHIGAN

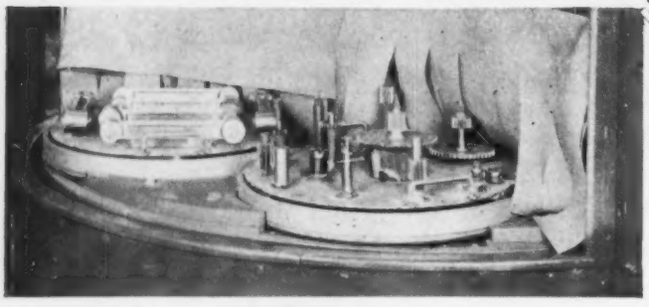
The More It's "WORKED" The Less Tired It Will Get

"COLD WORKING"



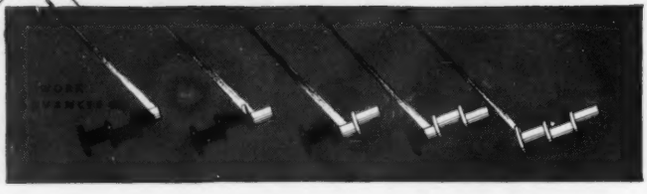
The peening operation — hammering the metal with round shot — "compacts" the surface of the metal to develop greater resistance to deformation and fracture. Result: you have a choice of—

a. increasing service life
b. higher stressing of parts
c. reducing size and weight
d. using less expensive materials
e. eliminating or reducing cost of subsequent operations



Pangborn Standard Shot Peening Table, front view. ROTOBLAST* Model impels shot by centrifugal force, AIR BLAST Model by compressed air.

*Trademark of the Pangborn Corporation

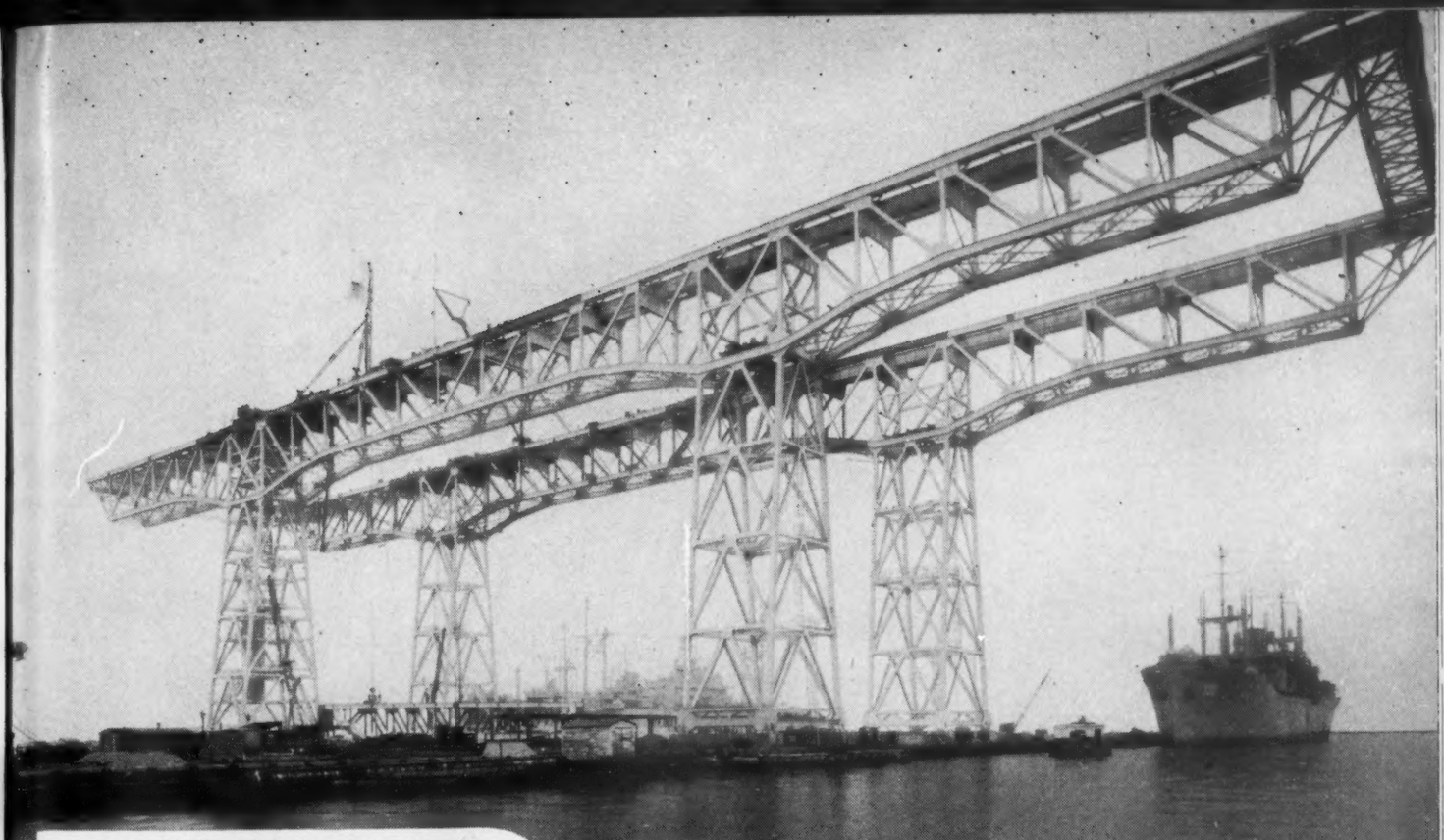


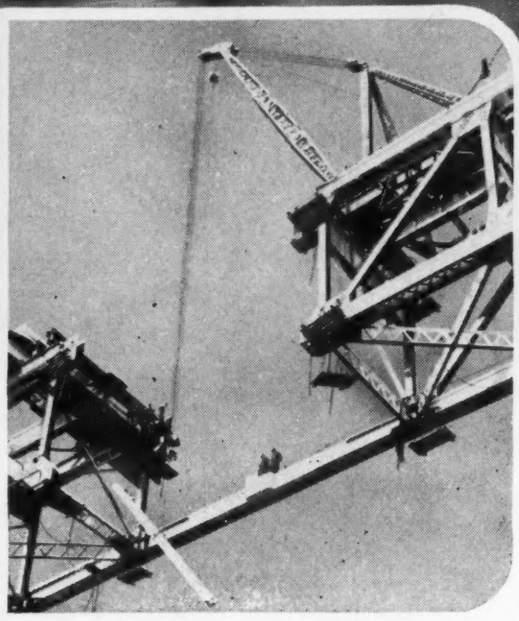
Pangborn Shot Peening equipment is being used for a great variety of work — from coil springs to crankshafts. A free booklet, "Shot Peening — What It Means to You", describes the application and gives performance data. Write to Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment*. Pangborn Corporation, 1298 Pangborn Boulevard, Hagerstown, Maryland.

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

BLAST CLEANS CHEAPER WITH THE RIGHT EQUIPMENT FOR EVERY JOB





The World's Largest Crane Runway

THIS CRANE runway for the San Francisco Naval Shipyard at Hunters Point, Calif., is capable of lifting gun turrets and other huge sections weighing as much as a million pounds. American Bridge Company fabricated and erected the structural steel for this massive 8,400-ton structure, including traveling cranes, crane runway bridges, and towers. 730 feet long and extending 162½ feet over the water on each end, the 209-foot high assembly will carry two traveling cranes, each having a 142-foot span, and operating either singly or in tandem.
Inset—American Bridge Erection Crew closing the last runway bridge trusses.

. . . *fabricated and erected by* AMERICAN BRIDGE

RECORD breaking structures like this new Navy crane runway are rare. But the statement "*Fabricated and erected by American Bridge*" applies equally to thousands of jobs of all types and sizes.

Our unexcelled facilities and equipment, our technically trained personnel, and our wealth of experience . . . all these are at your service, regardless of the size of your project. Just contact our nearest Contracting Office.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Contracting Offices in: Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

Improvising on SPRING MUSIC WIRE

When spring "specs" say: "Make it of music wire"—we could call it a day. Music wire is a well-known standard product and lots of springs are made of it. But with a particular eye to production and performance balance, we use several kinds of music wire, each keyed to special uses. By broadening the field of "standards," Wallace Barnes provides additional possibilities for quality control and economy in springmaking.

Sharp with the "Flats," too!

For flat springs and small stamped parts, Wallace Barnes also processes in its own mill many tempers and hardnesses of spring steel to meet requirements of intricacy or endurance.

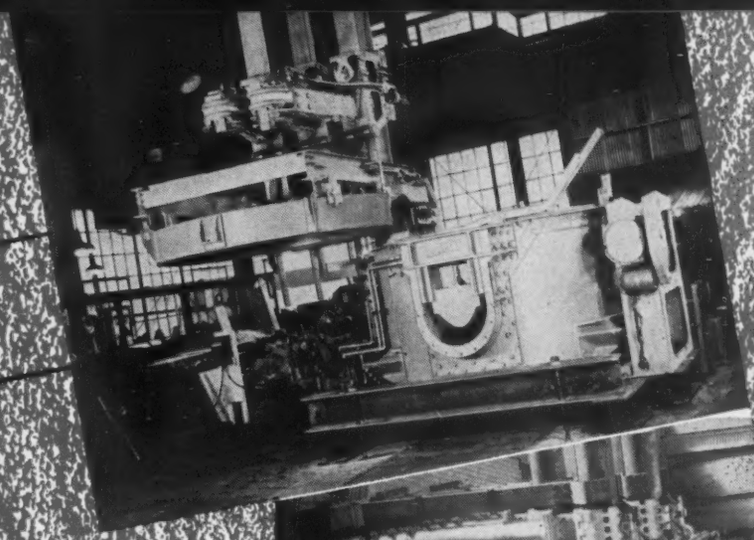
Wallace Barnes SPRINGS

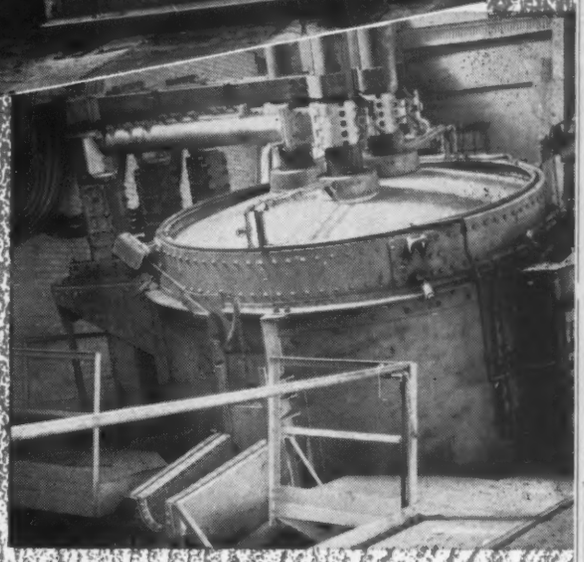
SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONN.
DIVISION OF THE ASSOCIATED SPRING CORP.

AND IN CANADA, THE WALLACE BARNES CO., LTD., HAMILTON, ONTARIO

For Today's Steel Production Demands



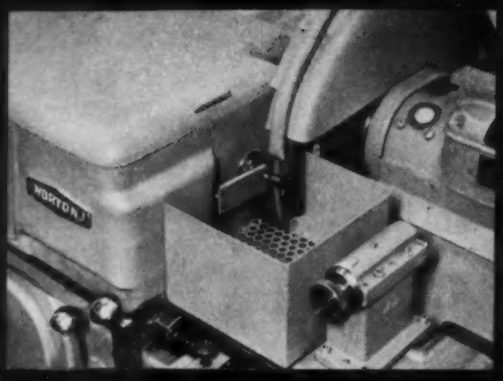


INCREASE your tonnage—
SAVE on power—
GET CONSTANT, UNIFORM
CONTROL *with*

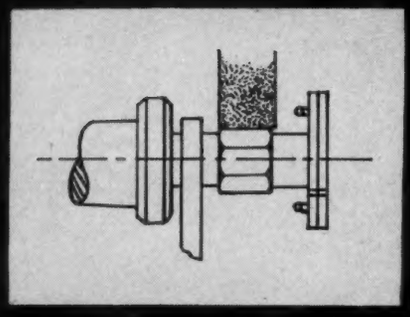
SWINDELL
ELECTRIC ARC
MELTING FURNACES

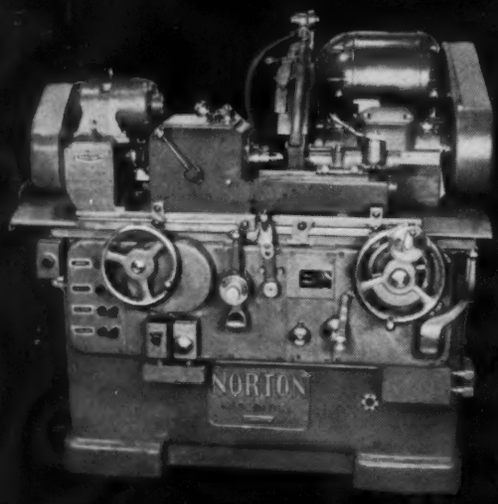
SWINDELL-DRESSLER *Corporation*
Designers and Builders of Modern Industrial Furnaces
PITTSBURGH 30, PENNA.

Doing Cam and Shape Grinding?

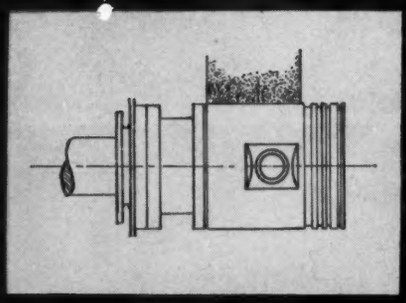


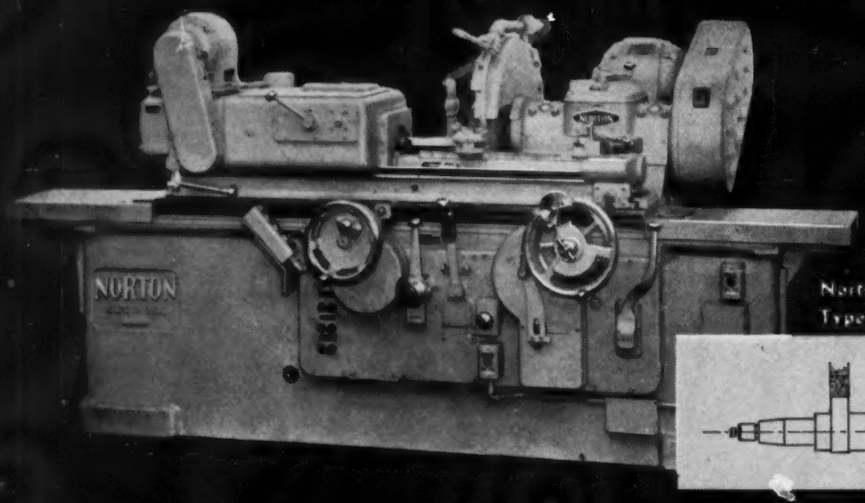
Norton Distributor Cam Grinding Attachment on 6" Type C Semiautomatic Cylindrical Grinder.



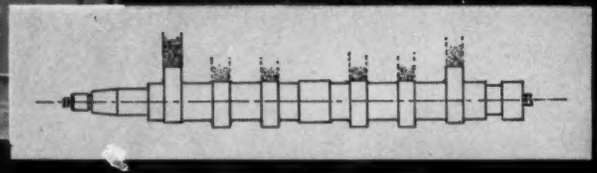


Norton 4 x 7" Cam Grinding Attachment on a 6 x 18" Type C Semiautomatic Cylindrical Grinder.





Norton 5x24" Cam-O-Unit on a 10x36" Type C Semiautomatic Cylindrical Grinder.



NORTON GRINDERS
and Lappers

NORTON Has a Versatile Line of Cam Grinding Equipment

MANY mechanisms in production today demand cam and shape contours ground to exacting requirements — both for accuracy and finish. Norton's cam and shape equipment has been made to handle a large variety of work — ranging from large Diesel camshafts to tiny shafts for motion picture projectors.

Outstanding features of Norton Cam and Shape Grinding Equipment are:

- **Easy Operation**—adjustments few and easily made
- **Rapid Operation**—gives low cost production
- **Adaptability**—suitable for large variety of requirements
- **Dependability**—long-proven Norton design

If you have a cam or shape grinding problem put it up to the Norton staff of cam specialists. Write for catalog #2053-6 on Norton Cam and Shape Grinding Equipment or Catalog #2262 on the Norton Cam-O-Matic Grinder for automotive type camshafts.

NORTON COMPANY, WORCESTER 6, MASS.

Distributors in All Principal Cities

M-541

ROLL FORMING CAMS

DISTRIBUTOR CAMS

ECCENTRICS

AIRCRAFT CAMSHAFTS (Reentrant Curves)

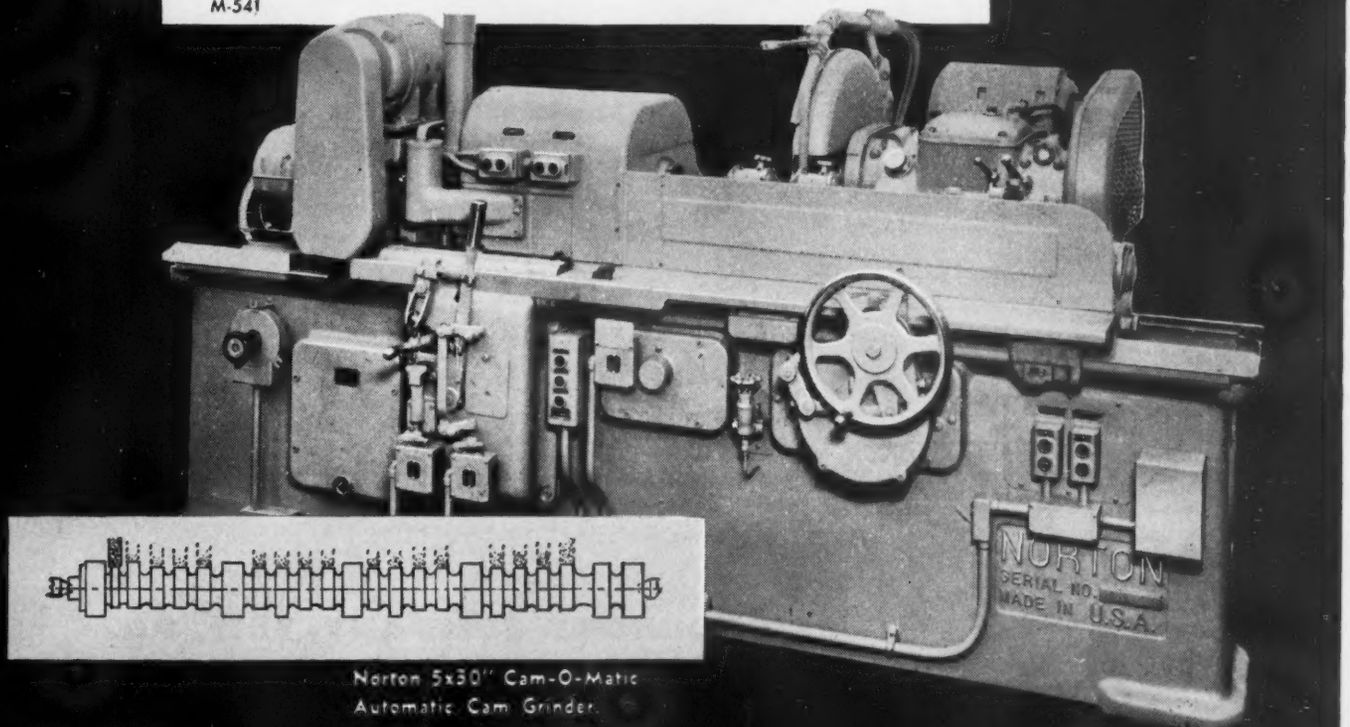
DIESEL CAMS

ELIPTICAL PISTONS

AUTOMOTIVE CAMSHAFTS

SINGLE CAMS

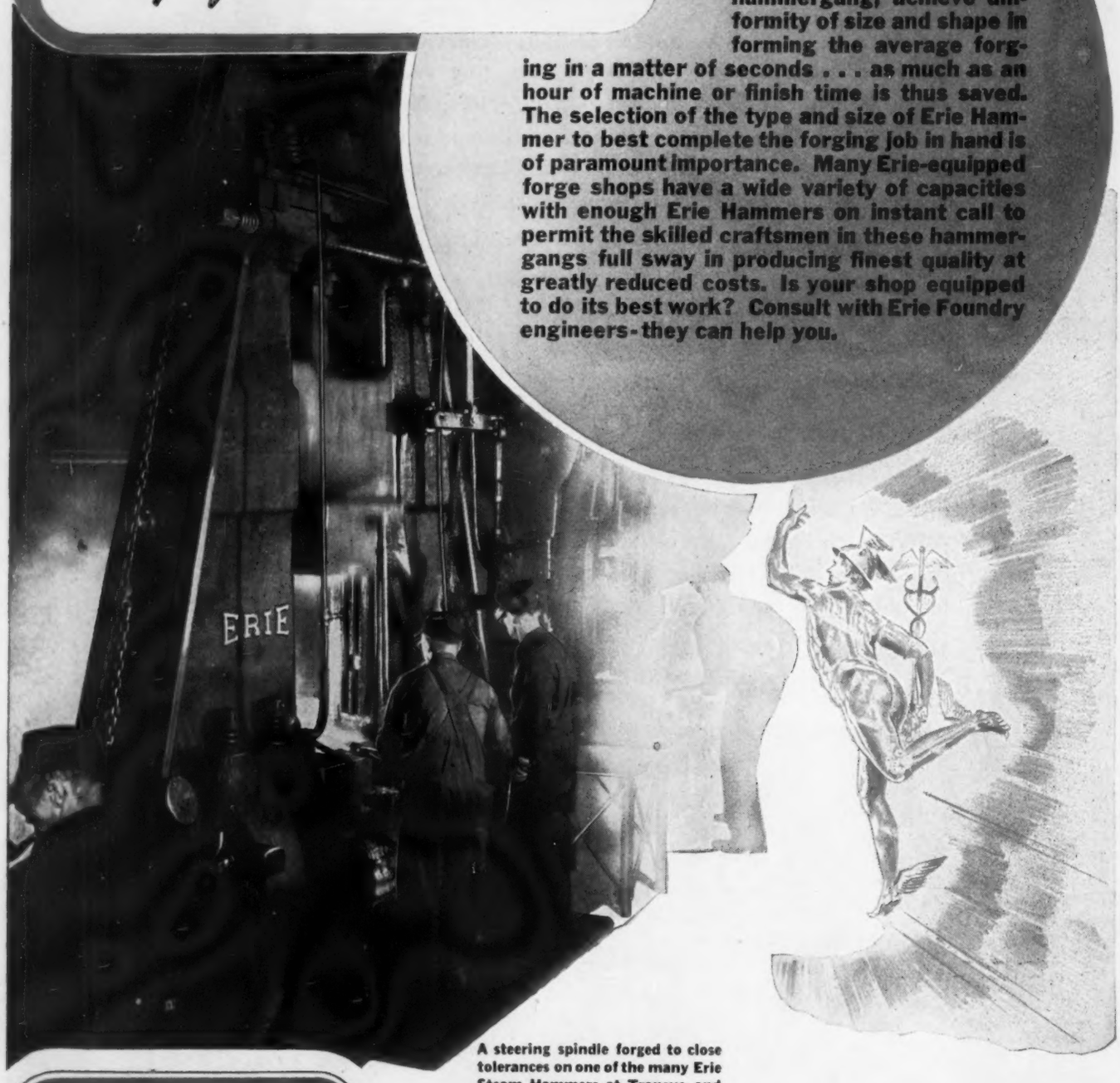
SMALL ENGINE CAMSHAFTS



Norton 5x30" Cam-O-Matic Automatic Cam Grinder.

Where 60 Seconds May Gain 1 Hour—

ERIE STEAM HAMMERS in the modern forge shop, matched by the skill of the hammergang, achieve uniformity of size and shape in forming the average forging in a matter of seconds . . . as much as an hour of machine or finish time is thus saved. The selection of the type and size of Erie Hammer to best complete the forging job in hand is of paramount importance. Many Erie-equipped forge shops have a wide variety of capacities with enough Erie Hammers on instant call to permit the skilled craftsmen in these hammergangs full sway in producing finest quality at greatly reduced costs. Is your shop equipped to do its best work? Consult with Erie Foundry engineers - they can help you.



A steering spindle forged to close tolerances on one of the many Erie Steam Hammers at Transue and Williams Steel Forging Corporation, Alliance, Ohio.

ERIE

ERIE FOUNDRY COMPANY, ERIE, PA.

ERIE BUILDS *Dependable* HAMMERS

GOVERNOR OF *Friction*

(Herschel Coefficient of Friction)

As power is the life blood of industry, friction is the deadly poison that can slow wheels, reduce efficiency to the point of disaster.

Correct lubrication, obviously, is the preventive which protects power against the depredations of friction. And . . . the coefficient of friction of a lubricating oil is an important factor in the utilization of input power in all machines.

Sinclair Research is ever alert to aid you in developing maximum output from your equipment with such apparatus as the Herschel Coefficient of Friction machine, shown above. This machine is invaluable where lubrication of all parts of machinery is concerned.

With such apparatus and the continuous effort of skilled experts in refinery control, Sinclair assures you of outstanding performance from lubricants developed specially for your specific application.

Sinclair Metal Working Oils

For General Alloy Steels:
WILKUT OILS

For Tough Alloys:
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SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

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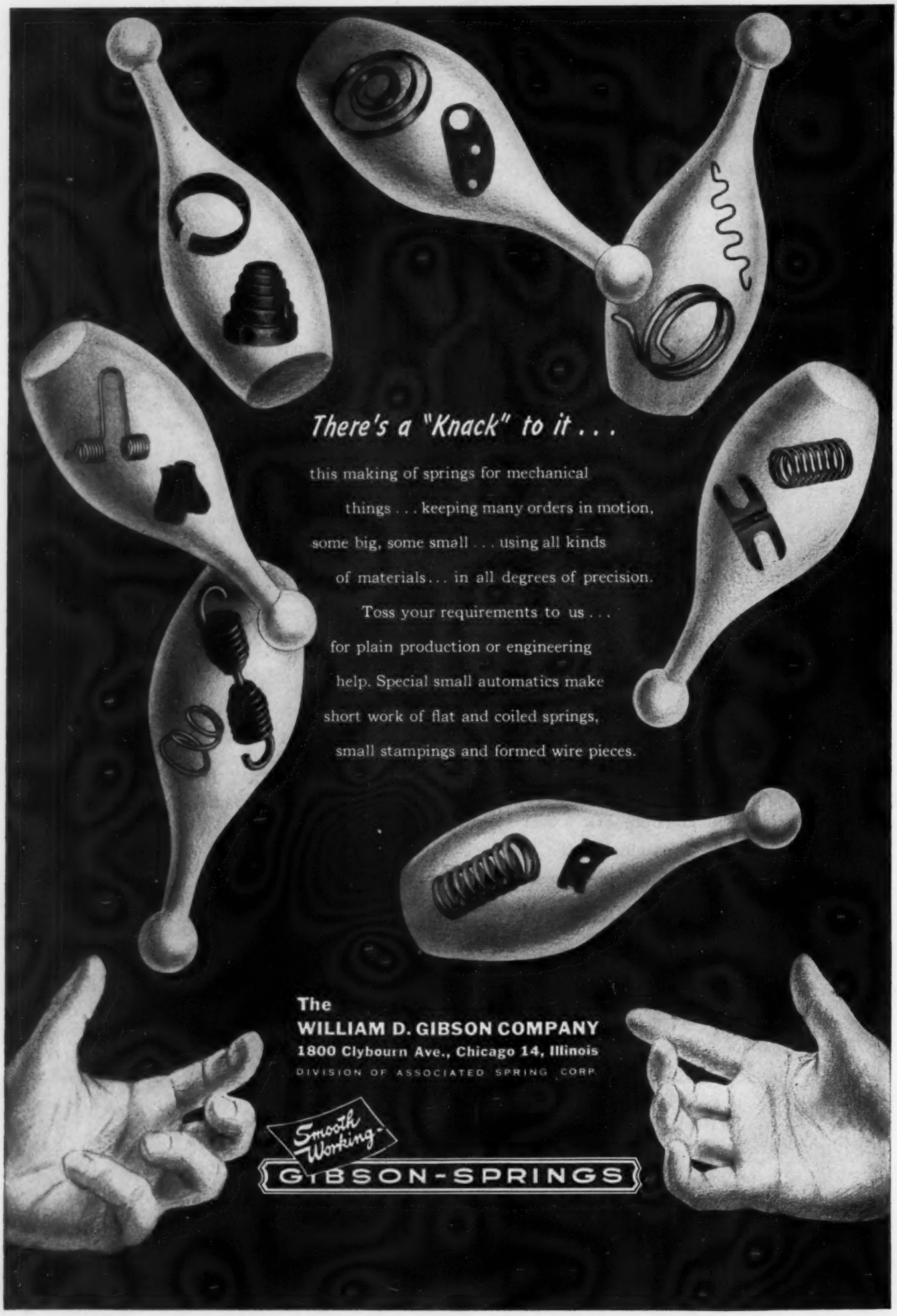
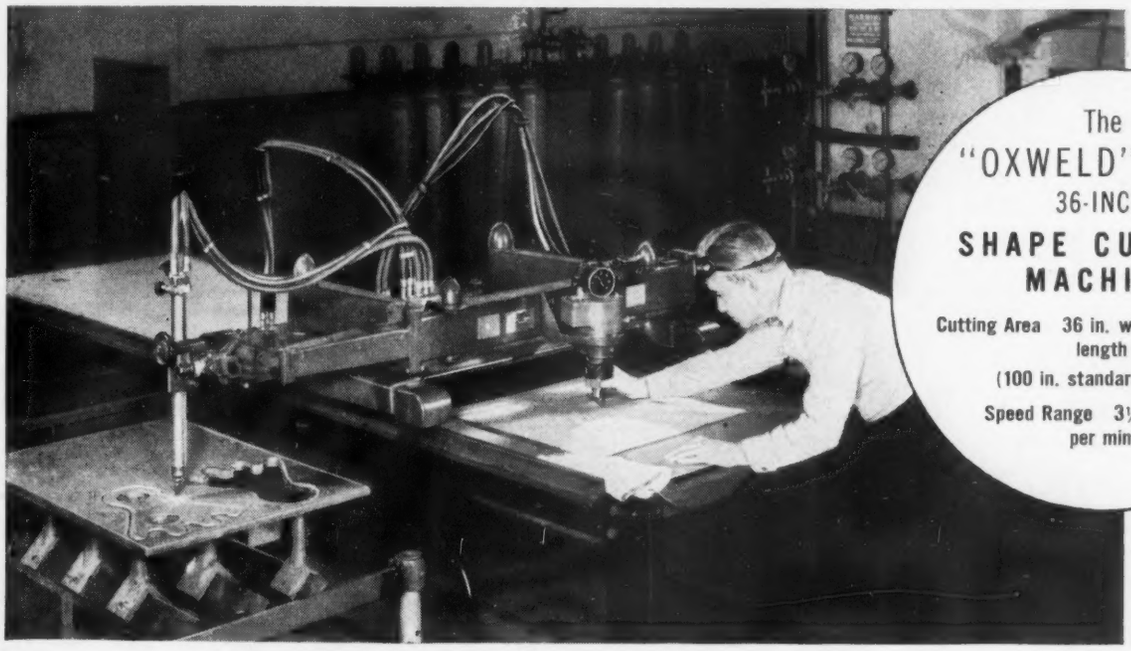
Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE


There's a "Knack" to it . . .
this making of springs for mechanical things . . . keeping many orders in motion, some big, some small . . . using all kinds of materials . . . in all degrees of precision.
Toss your requirements to us . . . for plain production or engineering help. Special small automatics make short work of flat and coiled springs, small stampings and formed wire pieces.
The
WILLIAM D. GIBSON COMPANY
1800 Clybourn Ave., Chicago 14, Illinois
DIVISION OF ASSOCIATED SPRING CORP.
Smooth Working
GIBSON-SPRINGS

a new HIGH-PRODUCTION tool for SHAPING steel parts

. . . a new high-speed, high-capacity oxy-acetylene flame-cutting machine for mass production of steel shapes up to 36 inches wide.



The "OXWELD" CM-15 36-INCH **SHAPE CUTTING MACHINE**

Cutting Area 36 in. wide by unlimited length (100 in. standard length)

Speed Range 3½ to 28 in. per min.

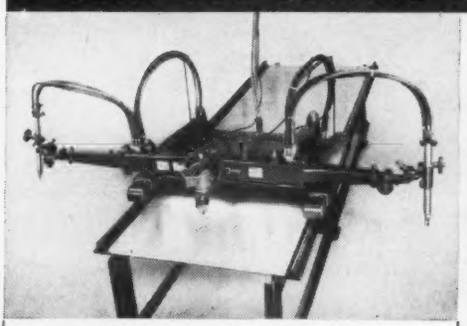
Line Tracing — Shapes to be cut can be traced from full-scale blue prints or drawings.

Strip Templet Tracing — Many parts of the same shape can be cut automatically by using a strip templet.

Magnetic Tracing — For repetitive cutting of complicated shapes with close tolerances, a magnetic tracing unit can be readily attached to the machine.

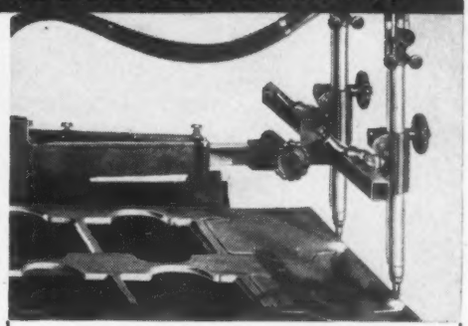
Call or write any Linde office for a descriptive folder. Ask for Form 6021.

BUILT FOR CUTTING PRODUCTION CORNERS



DOUBLE-ENDED OPERATION

Dual controls and blowpipe mountings provide for mounting blowpipes on either or both sides of the machine, and permit cutting on both sides simultaneously or cutting can be done on one side of the machine while plate is being set up on the other.



MULTIPLE OPERATION

Two free-moving pivoted arms mounted on the free-rolling carriage give blowpipe motion in any direction within the limits of the work area of the machine. An extension bar is available, for mounting more than one blowpipe on either side of the machine.

LINDE OXYGEN
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UNION CARBIDE
OXWELD, PUROX, PREST-O-WELD, HELIARC, AND UNIONMELT APPARATUS
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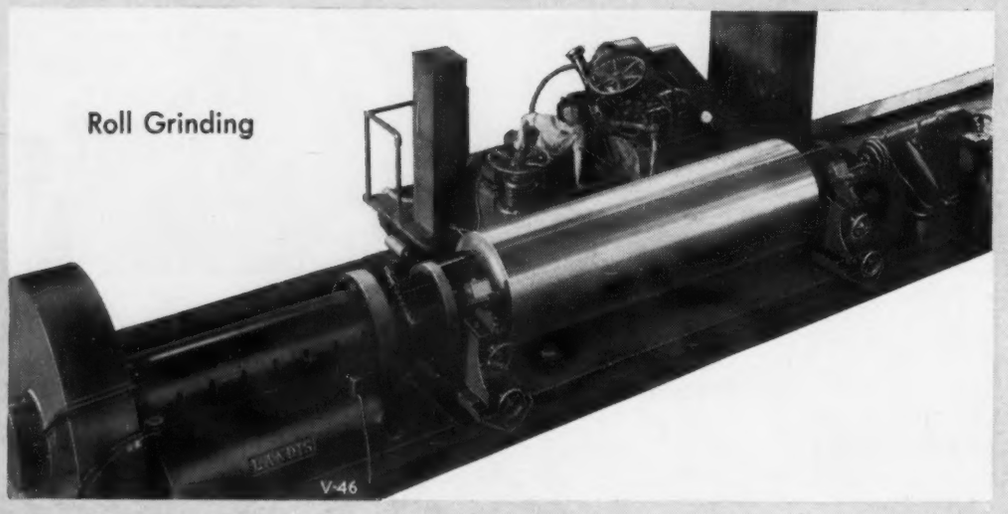
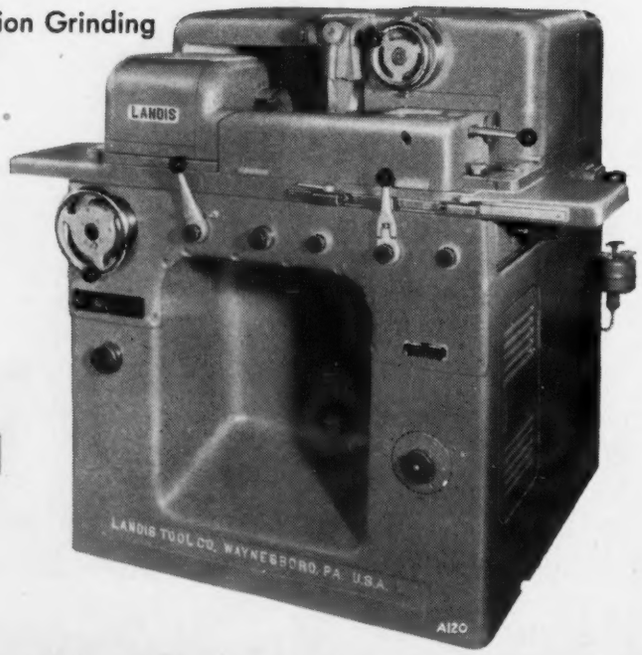
Roll Grinding



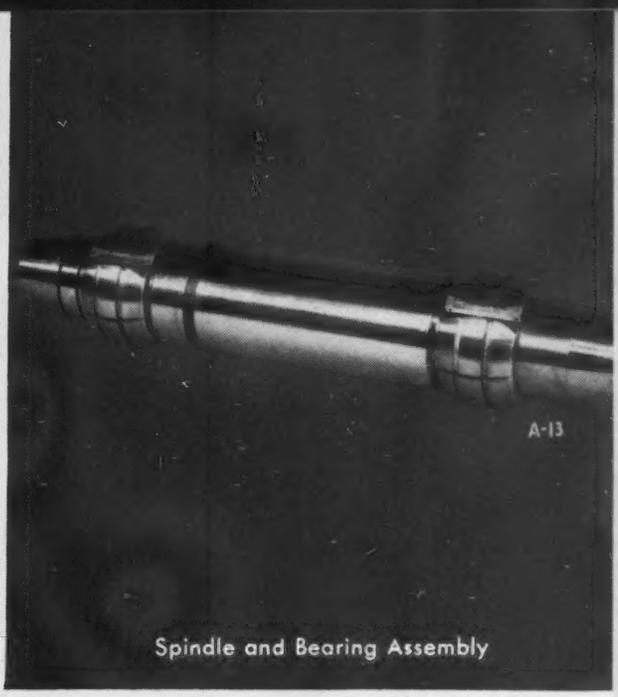
Precision Production Grinding



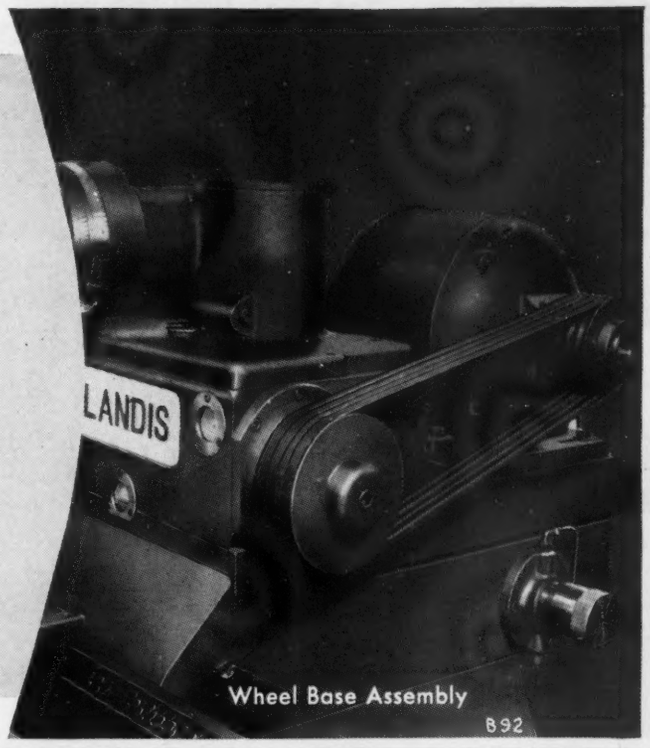
LANDIS TOOL

Precision Grinders

Microsphere Spindle Bearing

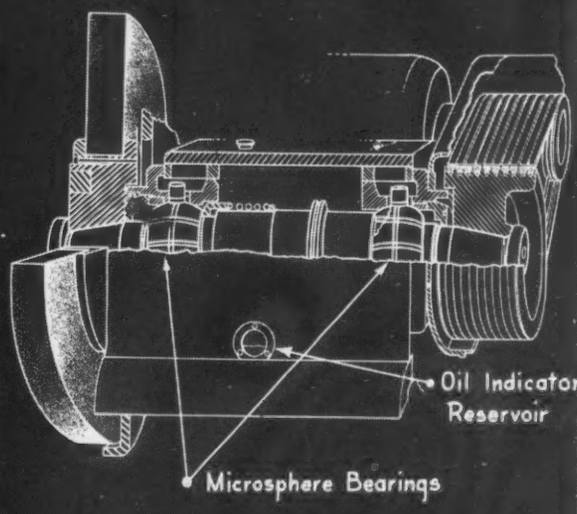


Spindle and Bearing Assembly



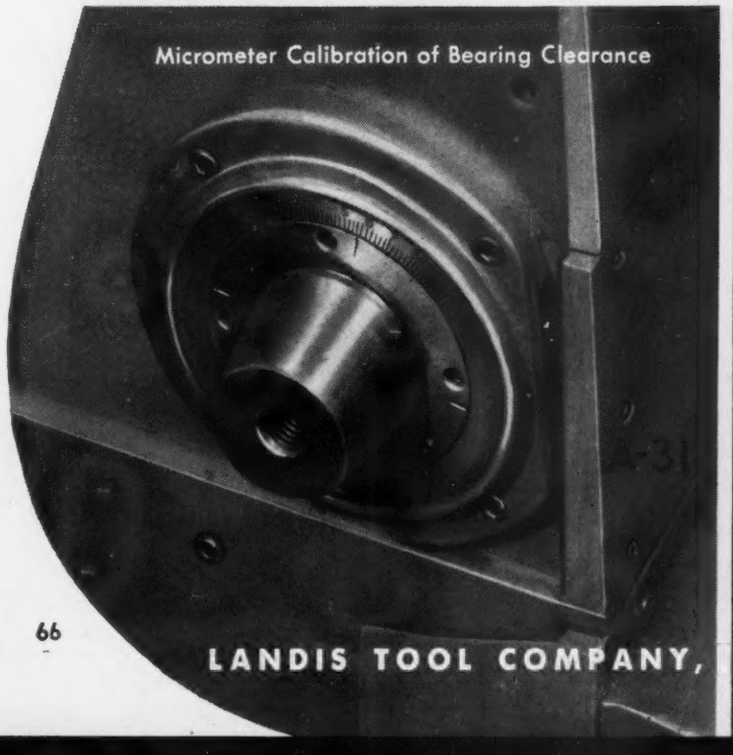
Wheel Base Assembly

B92



Cutaway of Wheel Base Assembly

Micrometer Calibration of Bearing Clearance



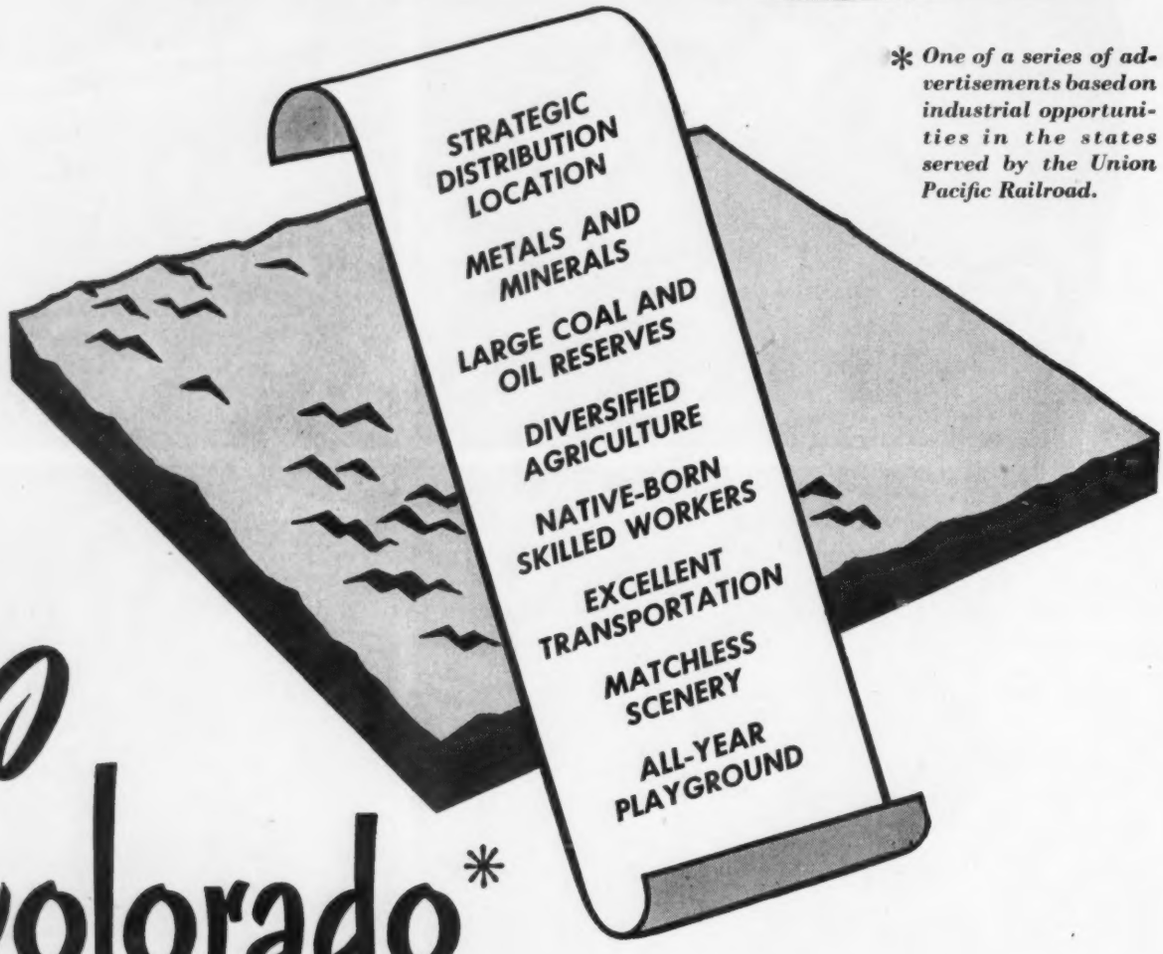
Cutaway of Bearing Assembly

LANDIS TOOL COMPANY, WAYNESBORO, PA.

UNION PACIFIC

TREASURE MAP OF INDUSTRY

* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*



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Colorado offers industry many desirable sites for manufacture, distribution, warehousing, and other purposes. It is strategically located for national distribution.

Diversified agricultural products are of high quality due to favorable climate and soil.

More than 250 useful metallic and non-metallic minerals and compounds have been found, including precious uranium. Timber, oil and coal are practically unlimited.

Native-born skilled labor, and a healthful climate resulting in fewer "time-outs" assure economical production.

Colorado provides sound state economy, modern educational and cultural facilities.

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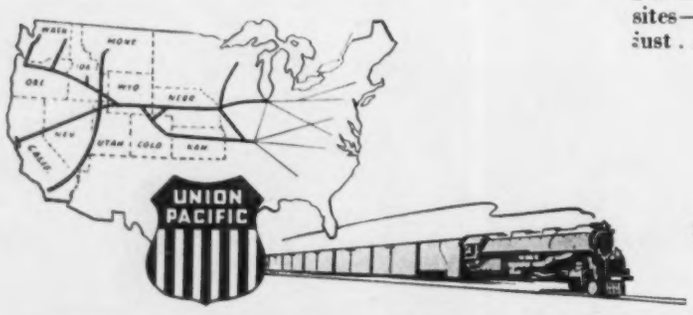
Union Pacific provides Colorado with unexcelled freight and passenger transportation. Every night, over night Streamliner service between Denver-Chicago . . . Denver-St. Louis.

For assistance in securing industrial and commercial sites—and for all-weather, dependable rail service, just . . .



be Specific – say "Union Pacific"

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

"Give us **Airco's** new Elite aluminum brazing flux and #716 wire **every time** . . . they do a swell job . . ."

says Mr. Walter O. Schleif, Plant Superintendent, Bell Specialty Manufacturing Company, Inc., Brooklyn, New York

Used in the manufacture of Solar aluminum furniture at Bell Specialty, Airco Elite Aluminum Brazing Flux and #716 Brazing Wire have more than proved their ability to meet the demand for a high grade, economical brazing alloy, with a satisfactory low melting point. They give excellent results in the fabrication of a wide variety of aluminum products—from cooking utensils and electrical appliances to metal furniture, window frames and other extruded aluminum shapes.

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Solar Step-Up

Solar Juvenile Chair

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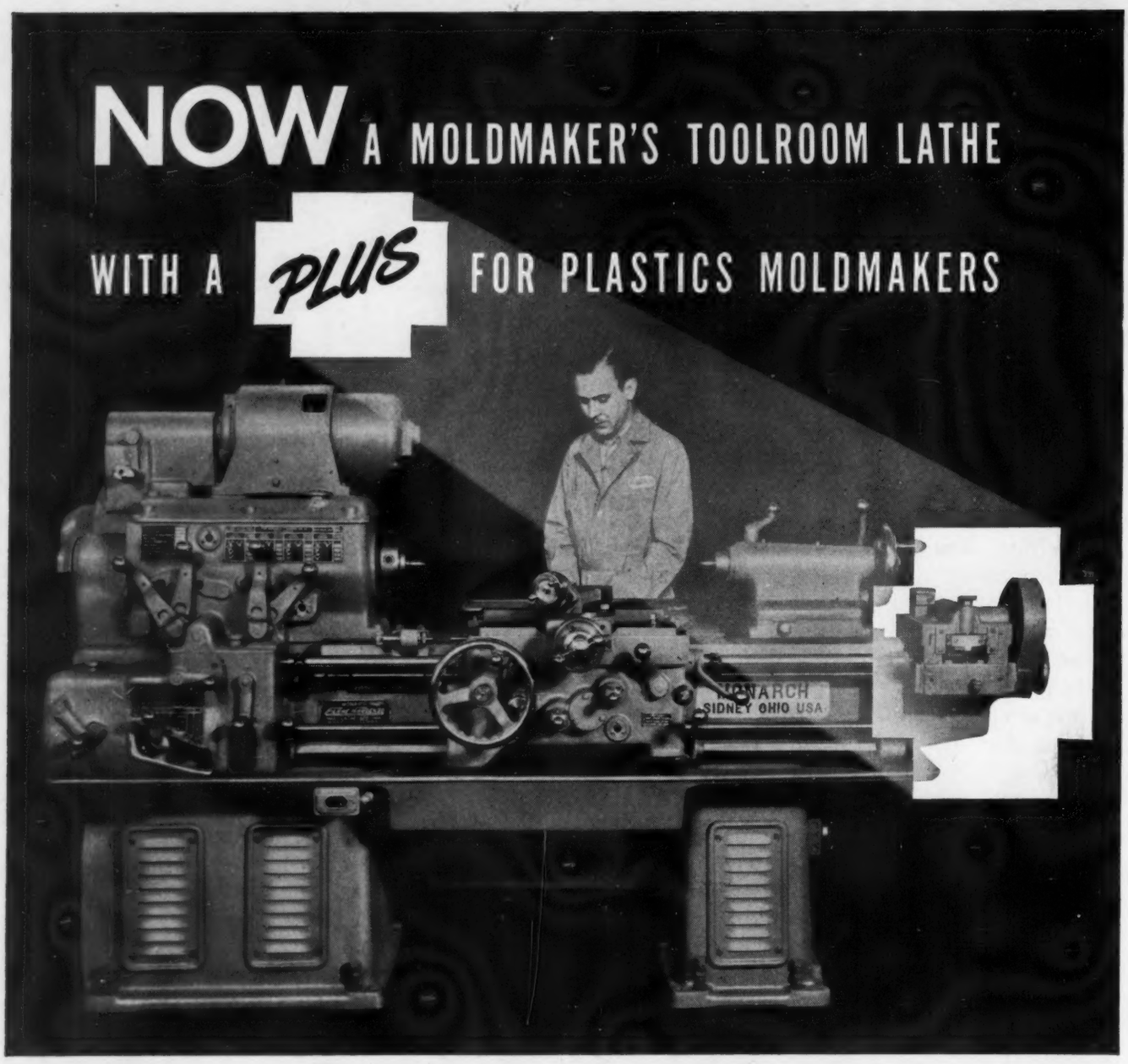
Headquarters for Oxygen, Acetylene and other Gases . . . Carbide . . . Gas Welding and Cutting Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

NOW A MOLDMAKER'S TOOLROOM LATHE WITH A PLUS FOR PLASTICS MOLDMAKERS



A complete range of lead variations—you can set your machine for any one of them in exactly one and one-half minutes!

Compare that performance with a normal toolroom lathe's—and change gears requiring thirty minutes to change. Think what you'll save on production time—and on original investment in change gears, too—especially if any sizable share of your production is thread molds for plastics.

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NEXT WEEK . . .

Cutting Costs, Increasing Output with Modern Machine Tools—Boring
Oxygen in Steelmaking
Budgeting Industrial Lighting Costs
High Temp Steels for Gas Turbines
Converting Turnings into Melting Stock

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 24 JUNE 16, 1947

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★—Denotes regular features.

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are Better

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Heavy drop forging of SAE steel. Fitted with drop forged thrust bearing. Entire assembly extra thick for greater capacity and shock resistance.

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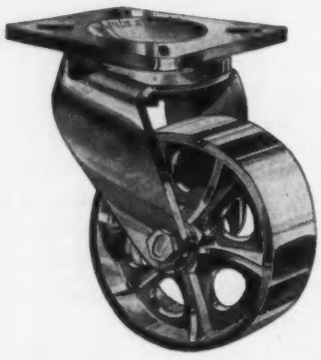

This new catalog lists the complete Rapids-Standard Caster line together with specification, capacities and suggestions for more efficient use. Write for your copy today.

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The Rapids-Standard Co., Inc.

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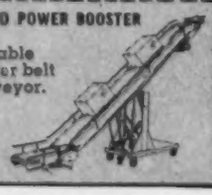
Portable power belt conveyor.



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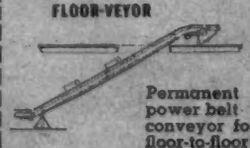
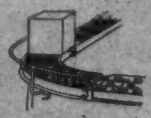
FLOOR-VEYOR
Permanent power belt conveyor for floor-to-floor use.



RAPID-WHEEL CONVEYORS
Flexible gravity wheel conveyor.



RAPID-ROLLER CONVEYORS
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Sales Division—335 Peoples National Bank Bldg., Grand Rapids 2, Michigan Offices in Principal Cities

June 16, 1947

Free Competition

Why has the American system of private enterprise made an enviable record whereas private enterprise in many other parts of the world has disintegrated? Why also does the American system result in efficiencies unmatched by any other system—efficiencies that permit the American worker to produce and earn several times as much as his opposite number in Russia, France, England and in many other countries?

In the "New York Times" of June 8 Russell Porter quotes two authorities who believe that the answer to these questions lies in the freedom of competition that is permitted under the American system. One of these authorities is Virgil Jordan, president of the National Industrial Conference Board. Before a meeting of the Edison Electric Institute at Atlantic City, he declared that the main factor in the economic achievements of our American system is "our comparative success in adhering to economic freedom, especially as manifested in free competition in free markets."

The other authority is R. T. Haslam, vice president of Standard Oil Co. of New Jersey. Mr. Haslam, who has visited 15 countries in Latin America and Europe since the end of the war, concludes in a pamphlet entitled "America's Real Resource" that the advantage of our system lies in "the relative freedom with which an American can find work or start a business, move from one place to another or introduce a new line of goods."

"No such opportunities exist abroad. Foreign trade associations of producers, wholesalers and retailers guard their vested interests jealously, keeping out new members and keeping non-members out of business in order to prevent destructive competition. Trade unions join with trade associations to restrict competition. Prices are fixed, markets divided, costs and prices kept up and wages are kept down so that production and buying power are both restricted in foreign countries."

Many industrialists who are familiar with the practices in most foreign industrial nations will agree with Messrs. Jordan and Haslam that comparatively free competition is a major distinguishing feature of the American system and an important factor in its success. If this is true, now would be an opportune time to reappraise the forces that are threatening freedom of competition in the United States.

Undoubtedly a thorough study would reveal that abuses of power by labor leaders have become as great a menace to free competition as the traditional attempts at monopoly in the past. This is another excellent reason why the labor bill should become a law.

° ° °

KEY TO LOWER PRICES: E. R. Breech, executive vice president of Ford Motor Co., presented sound comment on prices in an address before the American Marketing Association last week.

Prices on most manufactured products will remain high, he said, because the costs of materials and wages entering into manufacture and the construction costs of new facilities have pushed the break-even point to a level that precludes price reductions for some time. Even some businesses that are breaking even today in an accounting sense, he added, are in fact liquidating their plant assets. This is because current costs do not provide sufficient funds to replace at today's prices the capital assets that are being consumed.

In spite of these handicaps, Ford is making headway toward lowering costs. Mr. Breech reported that a number of engineering improvements leading to cost reduction have been effected. One is a method of improving wheels which saves 4 cents per wheel or an annual saving of $95,000. Another is a redesign in speedometers that saves 81 cents per unit or $800,000 per year.

This is the kind of cost reduction that really

(OVER)

counts. Savings in costs that come from redesign of part, improvement in manufacturing method or increased efficiency anywhere along the line from raw material to market will be more potent in eventually lowering prices than any platitudes that can be uttered from Washington. —p. 74

° ° °

SLOW IMPROVEMENT: Editors of this publication again have questioned executives of representative metalworking companies as to deliveries and stocks on hand of certain rolled ferrous and nonferrous materials. The returns, when compared with those received in a similar study made last September, show an improvement in inventories of all items and an improvement in deliveries of all items except galvanized sheets and cold-rolled sheet and strip.

Inventories are badly out of balance. More than 46 per cent of the companies reporting have on hand less than 10 days' supply of galvanized sheets, whereas nearly 20 per cent have on hand from 3 to 6 months' supply of alloy steel bars. Small-size carbon steel bars and hot rolled sheet and strip steel are in short supply.

Nonferrous items are easier. Inventories and deliveries of copper, brass and aluminum products and copper wire and cable have improved perceptibly during the last nine months. —p. 57

• • •

WHY SHIPS BROKE UP: The board of investigation charged with studying the causes of ship breakages which occurred during the war has completed its report and sums up its findings as follows:

"The fractures in welded ships were caused by notches built into the vessels, either through design or as the result of workmanship practices, and by steel which was notch sensitive at operating temperatures. When an adverse combination of these factors occurs, the ship may be unable to resist the bending moments of normal services."

Of about 5000 ships constructed during the war, one-fifth sustained fracture casualties, 127 of which were classified as serious. Only eight vessels were lost and 26 persons lost their lives.

The report vindicates all-welded construction and it states that the board found that the steel furnished shipyards complied with present physical requirements. However, the implication is clear that more work of a fundamental research character in the field of vessel design and construction should be carried on diligently. —p. 120

SIGNS OF THE TIMES: Seemingly endless are the uses to which American mechanized equipment can be put. Ninety carloads of power shovels, bulldozers, jeeps, high-wheeled motor trucks, mobile spray units and semi-trailers have been sent to Mexico (p. 68) to assist in the joint campaign of the United States and Mexican governments against the dreaded hoof and mouth disease. . . . The birth rate of new businesses has declined. According to Dun & Bradstreet Inc. (p. 78) new enterprises started in the first four months of 1947 totaled 41,272 as against 48,254 in the comparable period of 1946. . . . A Senate committee recommends that RFC continue to operate the tin smelter at Texas City until June 30, 1949. Chief reason is that world tin stocks, will have dwindled to 64,000 tons by Jan. 1, 1949 (p. 66) against potential world requirements of 190,000 tons. . . . Etablissements Berliet, French automobile factory, was taken over by a committee of workmen at the time of the liberation (p. 71) and a fine of 143 million francs was imposed upon the original owners for illicit profits made during the war. Now the French government has decided to take over all shares of the company in payment of the fine. . . . The black market in automobiles (p. 73) is plaguing motor car manufacturers in about the same way that the black and gray markets in steel (p. 60) are embarrassing steel producers. As long as buyers are willing to pay exorbitant premiums for what they want, it is difficult to break up these markets. Supply that balances demand is the only positive remedy. . . . Axial air-gap electric motors being manufactured in Fairbanks-Morse's Freeport plant (p. 90) weigh 30 per cent less, are shorter by half and are 1 to 2 in. larger in diameter than conventional motors of the same horsepower. . . . Writing on the importance of drilling machines in modern manufacturing operations, Guy Hubbard emphasizes the great number of varieties and sizes of drilling machines by reciting the story (p. 88) of a drill maker who sent to a fellow artisan a hair-like drill with a note reading "smallest ever made." It was returned to the sender with a magnifying glass and a note calling attention to a hole drilled through the shank of the "smallest drill". . . . Department of Justice will defend the constitutionality of the recently enacted Portal-to-Portal Act (p. 69) in suits filed by two unions.

E. L. Shaner

EDITOR-IN-CHIEF

FIVE Advantages of Inland HI-STEEL

The low alloy, high strength steel

1 HIGHER STRENGTH

In contrast with ordinary structural steel, Inland Hi-Steel has nearly twice the yield strength, the same elongation, and almost 50% higher fatigue strength. With Hi-Steel, designers can increase strength without resorting to excessive weight and size of parts. On mobile units, Hi-Steel increases payload without sacrificing strength.

2 GREATER CORROSION RESISTANCE

Hi-Steel has more than twice the atmospheric corrosion resistance of copper-bearing steel and about five times that of ordinary structural steel. When its bare surface is exposed for a long period, the elements in it contribute to the production of a dense adherent rust which acts as a protective coating and greatly retards further corrosion.

3 MORE RESISTANT TO ABRASION

In resistance to abrasion, Hi-Steel is far superior to copper-bearing and ordinary structural steels. Coal companies and other bulk material producers use Hi-Steel in chutes, screens, and bunkers because of its long life. Where both abrasion and atmospheric corrosion are combined, Hi-Steel will outlast many "abrasion-resistant" steels.

4 EASY TO WORK

Because of its high ductility, Hi-Steel can be worked either hot or cold with little or no deviation from standard shop practice. It does not normally require heat treatment to retain or to restore its normal properties after working. Hi-Steel can also be flame cut as easily as ordinary structural steel, and can be welded by conventional methods.

5 LOW IN COST

The price per pound of Inland Hi-Steel is only moderately higher than ordinary structural steel. However, where a given strength is desired, sections of Hi-Steel can be made lighter, so the total cost of steel is frequently not increased. On mobile equipment, this weight saving quickly pays for the small difference in price by an increase in payload.

HI-STEEL meets the requirements of SAE Specification 950

Hi-Steel is rolled in structural sections, bars, plates, strip, and sheets. While the supply is limited, every effort is being made to bring you Hi-Steel in greater quantities.

Write for Booklet

INLAND STEEL

INLAND STEEL COMPANY
38 South Dearborn Street, Chicago 3, Illinois
Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

The Steel Rush of '47

Back in 1849, the cry of "*Gold*" sent a horde of men racing westward. Yes, there was gold in California—but not enough for all who hungered for it. Latecomers in the rush found themselves with worthless claims. Others found nothing at all.

Today the cry is for steel. After six long years of war, strikes and stoppages, an equipment-hungry nation is creating history's greatest demand for steel products.

Every day by mail, telephone and telegraph—a steady stream of orders pours into each of twelve great Ryerson plants. And, though steel production is now far above the pre-war level, the tremendous demand sometimes depletes our stocks. Often we are unable to ship many items on your order.

But, unlike the gold supply that faded before the eyes of the hapless Forty-niners, the supply of steel is being constantly replenished. Products out of stock today may be available the next time you check the nearby Ryerson plant.

And here at Ryerson trained personnel and the facilities of a complete Steel-Service system combine in a concentrated effort to deliver your steel requirements promptly. When the steel you need is not immediately available, we gladly assist you in the search for a practical alternate.

Today, during history's greatest steel rush, this guarantee of full co-operation and service is especially valuable. That's why so many steel users contact Ryerson for all requirements.

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

RYERSON STEEL

STEEL
June
16
1947

Material Stocks, Deliveries Improving

However, inventories are still unbalanced and limiting manufacturing operations. Hot and cold-rolled sheet and strip, galvanized sheet and small bars most difficult to obtain. Copper products easier. Metalworking executives report "gray market" offerings numerous

MATERIAL inventories and deliveries to metalworking companies are improving gradually but shortages still are limiting production—22 months after the end of hostilities.

A few steel products are in comfortable supply. The majority are difficult to obtain in sufficient quantities through regular sources. Certain items are critically short, particularly hot and cold-rolled sheet and strip, galvanized sheet, small size bars and some special products. Often the critically short items are key materials and set a ceiling on production, even though other materials are in adequate supply. Unbalance in inventories is common.

Metalworking companies are receiving many offers of scarce steel products through irregular channels at premium prices. Some are supplementing their supplies from regular sources by such purchases; others are turning down all "gray market" offerings.

This situation is confirmed by reports from scores of metalworking executives questioned by the editors of STEEL. The answers received in the current survey are compared with those received in a similar study made last September (STEEL, Sept. 9, p. 85). The comparison (see tables on pp. 58, 59) shows improvement in inventories of all items and improvement in deliveries of all items except galvanized sheet and cold-rolled sheet and strip. The change in hot-rolled sheet and strip, however, is so slight as to be negligible.

The reports by the metalworking executives do not reveal any excessive inventories in any steel products.

The tight situation in steel products persists despite a peacetime production record of about 80 million tons of ingots in the past 12 months, about 15 million tons more than were produced in any comparable peacetime period. A part of this has gone to build up "floats." Assuming steel production continues at near present levels, metalworking companies anticipate the improvement in stocks and deliveries will continue, although the shortage in flat-rolled products will remain acute for some months to come.

A SPECIAL REPORT TO INDUSTRY

Companies which are receiving a pro rata allocation from the mills on the basis of their prewar con-

sumption often find the tonnage considerably below their postwar requirements, due to large increases in capacity during the war period and to higher operations.

A number complain that the mills are several months behind on deliveries of allotments.

Generally, metalworking plants far removed from the steel producing mills report deliveries and stocks more critical than do plants located near the mills.

Nonferrous metal stocks and deliveries have improved somewhat more than steel. Nearly four out of five companies can obtain delivery on aluminum products in less than 60 days; last September only one-third could get shipment in 60 days. One third of the companies using aluminum products now have stocks sufficient for more than two months, against one sixth reporting such stocks nine months ago.

Stocks of 60 days or more are held by about 43 per cent of consumers of copper and brass mills products, against 16.7 per cent last September. Fifty-five per cent of the companies can obtain deliveries of copper and brass mill products within 60 days, compared with 23.8 per cent nine months ago.

Copper wire and cable are somewhat easier, with one third having stocks in excess of 60 days. Last fall, only 12.5 per cent had 60-day stocks. Deliveries have improved moderately, one third being able to obtain shipment in two months, against 25 per cent last September.

Stocks and deliveries of hot-rolled carbon bars have improved substantially in the medium and large sizes, but continue critical in the small sizes.

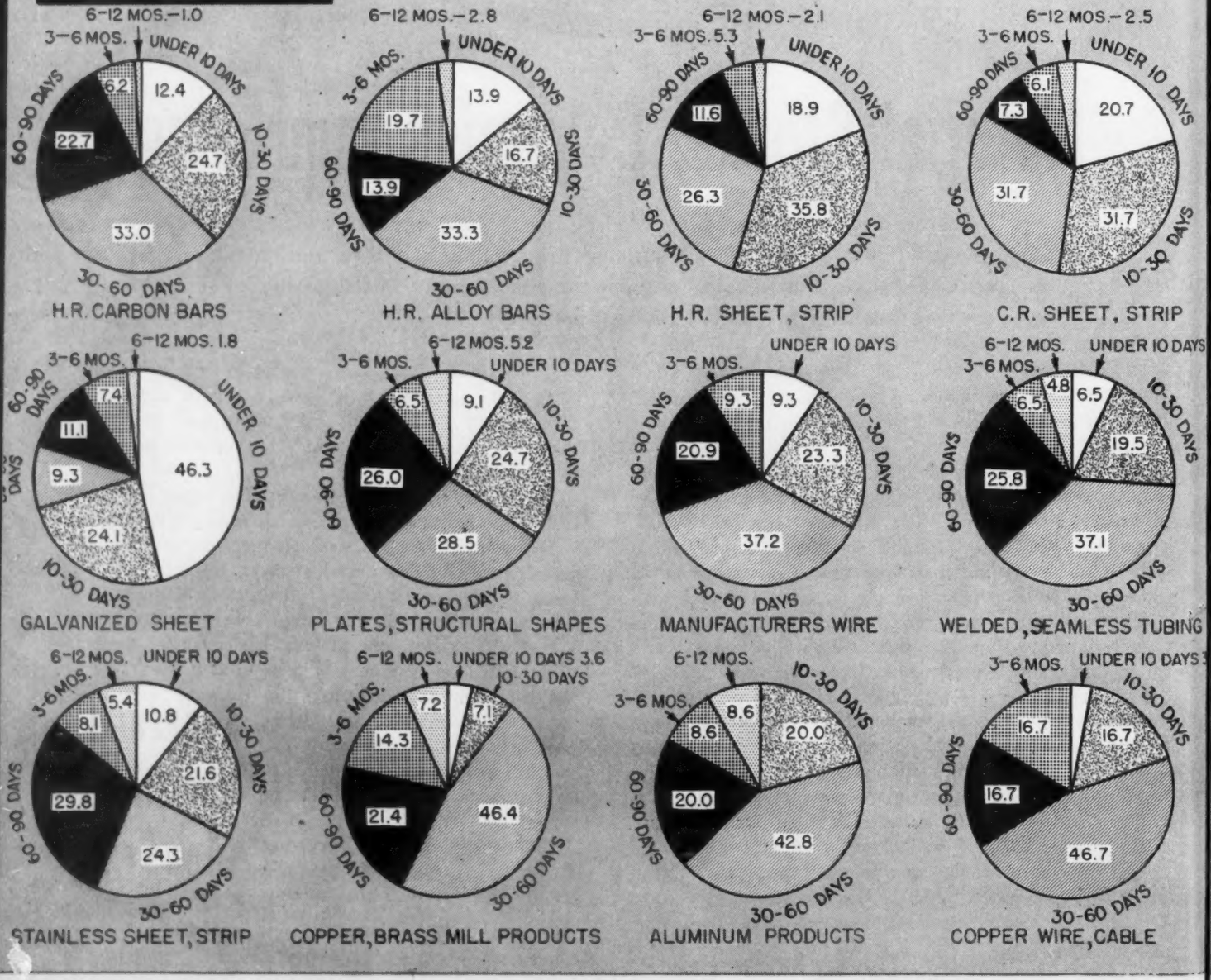
Hot-rolled alloy bars are definitely easier, with 64 per cent of companies being promised delivery within 60 days, against 39 per cent last September. Inventories have not changed appreciably.

INVENTORIES—SEPTEMBER, 1946-JUNE, 1947

Question: What is your current inventory position on each of the products listed?

	Percentage of plants having supplies for: Under 60 Days		Over 60 Days	
	September 1946	June 1947	September 1946	June 1947
H.R. Carbon Bars	78.5	70.1	21.5	29.9
H.R. Alloy Bars	64.1	63.9	35.9	36.1
H.R. Sheet, Strip	88.9	81.0	11.1	19.0
C.R. Sheet, Strip	86.1	84.1	13.9	15.9
Galvanized Sheet	94.4	79.7	5.6	20.3
Plates, Shapes	87.5	62.3	12.5	37.7
Manufacturers Wire	75.9	69.8	24.1	30.2
Welded, Seamless Tubing	81.4	62.9	18.6	37.1
Stainless Sheet, Strip	90.4	56.7	9.6	43.3
Copper, Brass Mill Prod.	83.3	57.1	16.7	42.9
Aluminum Products	83.3	62.8	16.7	37.2
Copper Wire, Cable	87.5	66.6	12.5	33.4

INVENTORIES



Hot-rolled sheet and strip, cold-rolled sheet and strip and galvanized sheet continue in acute shortage. Delivery promises on hot-rolled have not improved in the past nine months and are even more extended for cold-rolled and galvanized. Inventories are slightly larger, but only one in five companies has 60-day stocks of hot-rolled and galvanized and only one in six has two-months supply of cold-rolled.

As shown in the accompanying chart, less than 10 days' supplies of galvanized sheets are held by 46.3 per cent of the metalworking companies and less than 30 days' supplies by more than 70 per cent of the plants.

About 20 per cent of the companies have less than 10 days' stocks of both hot and cold-rolled sheet and strip. Over half the companies have less than 30 days' supplies of these products. Relatively few are promised early deliveries on flat-rolled products.

Plates and shapes show a moderate improvement over last autumn, both in deliveries and inventories. One in three companies has a 60-day supply, compared with one in eight last September. Deliveries under 60-days are promised to 25 per cent of the companies, against 20 per cent last fall.

Manufacturers wire shows a modest improvement. Forty-five per cent of companies are promised delivery in less than 60-days, against 32 per cent in the earlier study. Stocks generally are larger.

Welded and seamless tubing are easier, with 75 per cent of companies having more than a 30-day supply. Nearly half can obtain deliveries in less than 60 days.

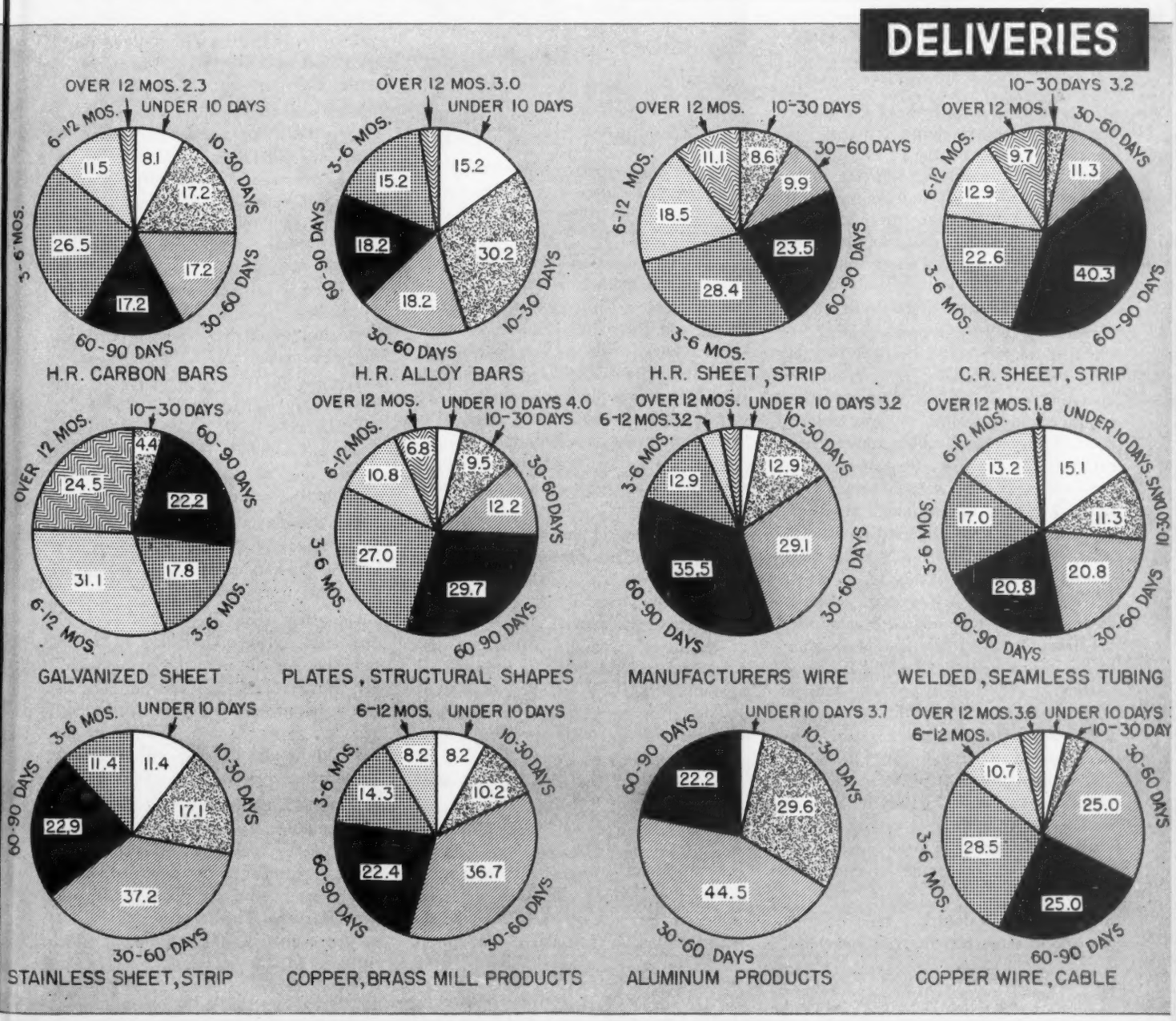
Stainless sheet and strip have been fairly easy since the war ended and have continued to improve in the past nine months. Two-thirds of users now can obtain delivery in

(*Please turn to Page* 164)

DELIVERIES—SEPTEMBER, 1946-JUNE, 1947

Question: What are the earliest delivery dates now promised by your regular suppliers?

	Percentage of plants promised delivery in: Under 60 Days		Over 60 Days	
	September 1946	June 1947	September 1946	June 1947
H.R. Carbon Bars	20.1	42.5	79.9	57.5
H.R. Alloy Bars	39.1	63.6	60.9	34.4
H.R. Sheet, Strip	18.2	18.5	81.8	81.5
C.R. Sheet, Strip	15.7	14.5	84.3	85.5
Galvanized Sheet	10.0	4.4	90.0	95.6
Plates, Shapes	19.6	25.7	80.4	74.3
Manufacturers Wire	32.0	45.2	68.0	54.8
Welded, Seamless Tubing	36.2	47.2	63.8	52.8
Stainless Sheet, Strip	44.4	65.7	55.6	34.3
Copper, Brass Mill Prod.	23.8	55.1	76.2	44.9
Aluminum Products	34.8	77.8	65.2	22.2
Copper Wire, Cable	25.0	32.2	75.0	67.8



"Gray" Market Steel Hearing Recessed

Investigators to gather additional data before probe is resumed formally. Study expected to continue for several months

Little evidence developed to show established steel companies at fault but consumers' complaints bring to light distribution problems

WASHINGTON

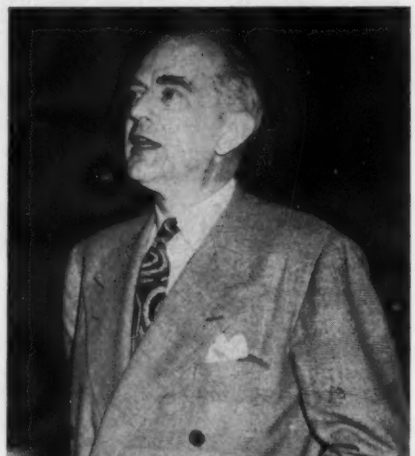
HEARING by the Steel Subcommittee of the Senate Small Business Committee into the steel gray market was at a standstill last week, a recess having been taken to permit analysis of testimony and to permit staff investigators to gather additional information.

The hearings have brought to light numerous problems affecting distribution of steel and Senator Edward Martin, who heads the subcommittee, says these problems must be investigated further before the hearings are resumed. George F. Meredith, executive director of the subcommittee staff, said the subcommittee probably will require several months additional hearings to get the full picture.

The Senate Small Business Committee last week after considering the report of the subcommittee on the investigation to date, decided to proceed with the probe subject to the call of the chairman. It was decided to concentrate on certain phases including the need for increasing steel capacity, improved scrap supply and gray market operations.

The subcommittee in its report to the committee, last week recommended intensified inquiry of operations of the steel industry including a study of the operation of the historical quota plan, continued investigation of gray market diversions, survey of mill-customer needs to determine whether companies receiving historical quotas are using steel shipped to them or reselling it at premium prices. It also suggested an investigation of vertical and horizontal integration in the steel industry to determine if the anti-trust laws have been violated, an inquiry into why mills are withdrawing from certain areas, an investigation of the export control system to determine destination of steel shipments, end-use of the steel, etc. Also the subcommittee urged a study of smaller steel users in order to determine the full extent of the damage to small business, a study of conversion deals by which scrap is sold to rolling mills on a variety of sales deals, and a survey of steel capacity and production to determine adequacy of supply.

Testimony to date has been conflicting and at times bizarre, with racketeers, gunmen and "mystery" men figuring in alleged gray market sales and offers of large tonnages of scarce steel, chiefly sheets and strip, at fantastically high prices. Little evidence has been developed to indicate established steel companies have wilfully participated in the gray market, and, for that matter, that the actual tonnage available from brokers was more than an extremely small proportion of the total steel moving into consumption.



GEORGE F. MEREDITH
Executive director of Senate Steel Subcommittee staff

However, one of the last witnesses to testify before the subcommittee recessed, Col. Willard F. Rockwell, Rockwell Mfg. Co., Pittsburgh, said his company has not been able to depend upon its sources of supply, even on the basis of an historical quota. He mentioned integrated operations by large steel producers as an increasing threat to the independent manufacturer and user of steel, and he said his company had spent a quarter of a million dollars on gray market steel at an average of $247 per ton.

After hearing from Frank A. Duerr, general manager, Troop Water Heater Co., Pittsburgh, a typical story of a smaller steel user threatened with a forced shutdown for lack of steel, the subcommittee called A. J. Hazlett, vice president in charge of sales, Jones & Laughlin Steel Corp., Pittsburgh. He said Jones & Laughlin was not withdrawing from the sheet steel market. At one period the company was forced by plant conditions to curtail sheet tonnage to all customers, but so far as Mr. Duerr's company was concerned, Jones & Laughlin shipped it in five months up to May this year, 345 tons of steel, which compares with Mr. Duerr's prewar average receipts from the company of 250 tons for an entire year. He is also to get 657 tons over an indefinite period probably extending through next year.

In other words, said Mr. Hazlett, this customer was getting almost three times more steel on a yearly basis, than he got before the war.

Nor, said Mr. Hazlett, was it correct to say that the reason for Jones & Laughlin's curtailment of sheet steel for its customers, was the acquisition of a steel drum company. Reporting that the company acquired a steel drum plant during the war, and some other container concerns, Mr. Hazlett said: "You will find there is no more steel used in the drum plants because of our operation of them than would have been used under any other ownership."

Terming the charge of "large quantities of gray market steel" in the country "largely a myth," Mr. Hazlett said: "We must conclude that the problem is simply one of an over-expanded demand at the present time."

The committee on this point, referred to testimony by Mr. Duerr, that his own postwar operations were up 60 to 70 per cent over prewar.

Declaring that Jones & Laughlin's steel capacity for all products is "amply sufficient for all normal requirements," Mr. Hazlett said, the situation has already improved in a few commodites, and "we expect that by the end of the year supply and demand will come into better balance in the more critical items."

Jones & Laughlin had only 80 per cent of operating capacity during 1946 because of the coal and steel strikes, and because corollary shut-downs tied up equipment needed for plant repair, said Mr. Hazlett. This represented a loss of approximately 700,000 tons, of which

400,000 would have been in flat-rolled.

"The present situation is not due to inequalities of distribution" he declared, "for there is no steel consuming industry which is receiving its full requirements of scarce steel items, such as flat-rolled steel." Explaining his view that "the small users have been taken care of pretty well," the witness said 93 per cent of his company's customers are in the under-$100,000-business category.

Furthermore, he said, the smaller users have been provided for at the actual deprivation of larger customers. Exports, he said, were no problem, representing in his company's case, less than prewar ratio to production and domestic use.

All steel from Jones & Laughlin was at standard mill prices, he emphasized.

On this point, the committee earlier had unwound a devious line of testimony leading from a St. Louis plant to a supply of steel that sold at $220 a ton.

Al. Levinson, president, Steelcraft Engineering Co., Cincinnati, builder of pre-fabricated steel homes, related how he got steel on priority for housing, and on his understanding that the federal housing authorities approved his project. Then, he told the committee, federal housing officials refused to approve the houses for government loans or insured financing.

His bank told him, he said, to cut his steel inventory. Through an advertisement he learned that the St. Louis Boiler & Equipment Co. wanted to buy steel. So he sold it, 862½ tons, at prices ranging from $60 to $180 a ton.

Other witnesses blamed government export policies for aggravating the tin plate shortage, also for a "government gray market" in which United States-produced metal is shipped abroad at a government price, and has to be bought back from foreign processors at many times the export figure.

National Malleable Files $100,000 Suit Against Union

National Malleable & Steel Castings Co., Cleveland, has filed a $100,000 damage suit in Common Pleas Court against the United Auto Workers-AFL union and its officials as the result of alleged damage caused when workers walked out on strike June 6.

Stewart Tame, manager of National Malleable's Cleveland plant, said the damage was caused when workers left molten metal in crucibles and air furnaces. Although the union reported its members would return to work June 8, Mr. Tame said that the damage took several days to repair and that no production was possible before June 11 though the strike was ended June 8.

West Coast Steelmaker Plans To Install 4 Open-hearth Furnaces

FIRST postwar addition to the West Coast's steel-producing capacity will be accomplished soon. Pacific States Steel Co., Niles, Calif., plans to install four 75-ton open-hearth furnaces, doubling present ingot capacity. On a single shift capacity of 300 tons a day, the furnaces will add an estimated 140,000 tons to the approximate 3.5 million tons annual capacity of far western steelmaking plants, an increase of about 4 per cent.

Pacific States Steel purchased the four open hearths from a government-surplus plant in the Midwest recently.

The company currently is operating four electric furnaces with annual capacity of more than 100,000 tons.

Meantime, other steel developments on the West Coast include opening of a new warehouse in northern California by a mid-western firm, and new records in production by the Kaiser Co.'s steel mill at Fontana.

Caine Steel Co., Chicago, has just completed a new warehouse in Emeryville. The warehouse has shearing machines, planograph cutting tables, slitting and roller leveling equipment. The company opened a service center in Oakland, Calif., about five years ago.

In May the Fontana blast furnace produced a record total of 41,529 tons of pig iron on coke consumption of 1362 pounds per net ton and a flue dust production of 45 pounds per net ton, with a 100 per cent ore burden. This output compares with the previous monthly record, set in May, 1945, of 38,291 tons.

At the same time, the open hearths produced 68,318 net tons of ingots. This exceeds the March, 1947, record of 64,454 net tons.

In addition, Fontana reports other new records in May. The 36-inch blooming mill produced 53,235 tons, and the 29-inch mill turned out 29,060 tons, compared with the previous records of 49,092 and 28,075 tons, respectively. Merchant mill tonnage was 16,584 against the record of 16,329 in April. The company's iron ore mine at Vulcan last month had a production of 115,734 tons against the previous high output of 93,228 tons in April.

Present, Past and Pending

ALUMINUM CO. ANNOUNCES PERSONNEL CHANGES

PITTSBURGH—George J. Stanley retires July 1 as vice president and general sales manager of the Aluminum Co. of America. He will continue as a director. At the same time the company announced Ralph V. Davies, Robert B. McKee and Donovan Wilmot, assistant general sales managers, have been promoted to vice presidents, Mr. Davies succeeding Mr. Stanley as general sales manager.

■ SHORTAGE OF STEEL MAY CLOSE FREIGHT CAR PLANT

PITTSBURGH—Insufficient supply of steel plates was causing Pressed Steel Car Co. Inc. last week to consider closing its McKees Rocks, Pa., railroad car manufacturing plant during July.

■ CONTINENTAL BEGINS MAKING LIGHT ENGINE

MUSKEGON, MICH.—Production of a new 1½ horsepower single-cylinder air-cooled engine for the mass market represented by walking-type tractors, power lawnmowers, scooters, pumps, small construction equipment and compressors has been started by Continental Motors Corp.

■ FOLEY NOMINATED FOR PRESIDENCY OF ASM

CLEVELAND—Francis B. Foley, superintendent of research for the Midvale Co., Nicetown, Philadelphia, has been nominated for president of the American Society for Metals.

■ BLAW-KNOX GETS BIG ORDER FOR GAS CLEANERS

PITTSBURGH—Blaw-Knox Co. has received an order from Northern Natural Gas Co. for 25 gas cleaners, each 60 in. in diameter, said to be the largest order for gas cleaners in the same size ever received from a single company.

■ FREIGHT CAR OUTPUT DECLINES IN MAY

NEW YORK—Freight car production in May receded to 3929 units from 4123 in April, the drop blamed on strikes and uneven flow of materials.

Prepare for Coal Strike In July

Steelmakers anticipating mine shutdown with negotiations between union and mine operators for new contract stalled

Henry F. Warden, right, chief negotiator for the southern coal operators, is shown at press conference as he explains why the operators "had eliminated portal pay as such" in the wage contract proposal as result of the approval of portal pay legislation. At left is H. H. MacAllister, Logan, W. Va., a member of the operators' negotiating committee. NEA photo

THAT man is here again!

For the next few weeks John L. Lewis, the big wheel among the coal miners, will hold the spotlight on the industrial stage as he maneuvers for a new contract with the mine operators preparatory to the return of the mines from government operation to private ownership June 30.

With Lewis rests the answer to the big question now looming on the industrial horizon: Will there be another serious coal mine work stoppage with accompanying slowing down of steelmaking and industrial operations in general?

At the moment the outlook is not too promising that a mine strike will be averted. Negotiations for a new contract with the mine operators, initiated several weeks ago, have broken down with Lewis and the operators reported miles apart in their thinking. Last week's wildcat strikes by some 15,000 miners in Pennsylvania as a protest against the Taft-Hartley labor bill give a foretaste of what to expect from the miners should the contract deadline come without agreement between Lewis and the mine operators.

Last week's strikes closed down 21 mines temporarily, most of them captive pits operated by steel companies, and cut daily coal production an estimated 100,000 tons. While this tonnage is relatively small in light of normal daily production of 2 million tons, the fact remains continuance of this loss for even a limited time would force sharp curtailment of steel production in the Pittsburgh district. Last week's wildcat mine strikes forced Carnegie-Illinois Steel Corp. to bank two blast furnaces in the Pittsburgh district. Earlier the company had curtailed pig iron output to the equivalent of 1½ furnaces in anticipation of the coal miners' projected vacation period starting June 28.

Oddly enough, even though a contract is not worked out with the operators by June 30, the miners actually will not be on strike even though they may not be working for the simple reason that under the terms of the miners' present contract with the government provision is made for a 10-day vacation period which the miners heretofore have passed up in lieu of extra pay. This year, however, the miners have indicated they plan to take the vacation starting June 28.

Of course, in event a contract is worked out with the mine operators before June 30 it is possible this vacation period would be tossed out. However, it is a factor to consider in sizing up the possibility of a mine stoppage, as is the report John Lewis is mentally toying with a new proposal to put before the coal operators.

Lewis is demanding a shortened work day and a wage increase which would provide $65.25 for a 5-day, 40-hr week, including five hours of travel time, and $85.97 if a sixth day is worked at overtime. Present wage scale provides $59.25 for a 5-day, 45-hr week, including five hours of travel time. It also provides $75.25 if a sixth day is worked at overtime. Northern mine operators have offered $56.75 for a 5-day, 40-hr week including five hours of travel time and $72.77 if a sixth day is worked at overtime. Southern operators have offered $63.50 for five 8-hr days without travel time, and $82.55 if a sixth day is worked at overtime.

Signing of the Taft-Hartley labor bill by President Truman could force postponement of a mine walkout under a provison authorizing the government to obtain injunctions against strikes endangering the nation's health and welfare. The provision calls for a delay of 80 days before a strike to permit mediation.

Spokesmen for the mines operated by the steel companies are not sanguine that a strike will be averted. One important captive mine operator said there is nothing, however, to prevent a quick settlement of the issues involved, since the whole thing could be disposed of in ten minutes if there could be a meeting of minds on the demands.

In event of a coal strike, steelmaking operations will be adversely affected quickly. The industry's stockpiles of coal are reported to average 29 to 30 days, but stocks in the hands of some producing interests are sufficient for no more than 15 days at most. This is said to be true especially in the Pittsburgh district. Blast furnace shutdowns are likely to follow immediately in event a coal strike is called. At the moment steelmakers are laying plans with a view to coping with conditions in event the miners strike.

Shippers of Products of Iron And Steel Oppose Rail Rate Boosts

Efforts made in Official Classification Territory to head off 25 per cent increase in tariff on lcl movements of articles on exceptions list and to avoid general increase on lcl shipments. Market disruptions feared if rates are raised

SHIPPERS of products made of iron and steel last week were petitioning the Interstate Commerce Commission for suspension of a 25 per cent increase in lcl rail rates on the exceptions list of manufactured iron and steel products in Official Classification Territory scheduled to go into effect June 20. Deadline for filing petitions was June 10.

Widespread dislocation of established markets is feared by manufacturers of the products involved, and their customers as well. Some observers point out that in event the increases are applied, localization of markets in many items is a likely possibility, the net result being that consumers now supplied by certain manufacturers may be forced to search out new supply sources as their established suppliers, unwilling or unable to absorb additional freight, withdraw from marketing areas distant from their plants.

The proposed increase would raise lcl rates which heretofore have been excepted from class rates. The increase would raise rates on this list from 40 per cent of first class rates to 50 per cent of first class, a boost of 25 per cent. Although the exceptions list would still remain in existence, the increase would in effect eliminate a great many exceptions from class rates, for by being raised to 50 per cent of first class rates they would correspond with fourth class rates.

It is this latter effect which particularly concerns shippers, since the railroads in Official Territory hope to put into effect on July 20 an increase in rates on all lcl shipments in first, second, third and fourth classes.

The increases proposed for July 20 would be on a mileage basis and would range from 10 per cent on long hauls to 110 per cent on short distances. Thus, lcl shippers of iron and steel products on the excepted list not only are confronted by a 25 per cent rate increase June 20 but also, through the raising of the excepted list from 40 to 50 per cent of the first class rate, thereby equaling the fourth class rates, they fear they may become subject to the proposed general increase in lcl rates for fourth class scheduled to become effective July 20.

Inasmuch as both proposed increases are for Official Territory only (roughly the northeastern section of the nation), that territory's lcl shippers of such products as bolts, nuts, rivets, chain, nails and rough castings, would be put at a competitive disadvantage in shipping into territories distant from their plants, as well as with producers in areas not affected by the rate boosts. This would tend to shrink the distribution area of a manufacturer located in Official Territory to that section. Conceivably, companies operating plants in other territories as well as in Official Territory might boost production in plants outside Official Territory to take advantage of rail rates that have not been increased.

Steel producers have not been particularly concerned with the two proposed increases in rail rates inasmuch as the increases would be on lcl shipments. The bulk of steel producers' shipments goes at carload rates. Steel warehouse shipments would be affected to some extent. However, objections to the proposed new tariffs come principally from manufacturers of products of iron and steel which move in considerable volume in lcl lots.

Steel Production Sets New Peacetime Record in May

New peacetime record in steel production was set in May when 7,332,828 net tons of steel ingots and steel for castings were produced, the American Iron & Steel Institute reported last week. This brought total production for the first five months of this year up to 35,318,435 net tons, almost 14 million tons more than in the like period of 1946 when strikes in the steel and coal industries held production down to 21,708,148 net tons.

Of the May total, open hearth production represented 6,633,203 net tons, equivalent to a 96.4 per cent rate of operation of these furnaces; bessemer furnaces, operating at 85.1 per cent of capacity, accounted for 372,823 net tons and electric furnaces produced 326,802 net tons, averaging 75.8 per cent of capacity. The combined rate of all facilities for May averaged 94.6 per cent of capacity, compared with 93.8 per cent in April, and 52.2 per cent in May, 1946.

Steel Wage Costs Boosted $285 Million This Year

Wage adjustments in the steel industry since Jan. 1, 1947, represent an added payroll of approximately $285 million over a 12-month period, according to the American Iron & Steel Institute. The total, equal to the net earnings of the industry in 1946, is computed from 1946 employment.

Basic labor rate has increased 172 per cent since 1923 and 156 per cent since 1933. Today the rate is $1.09 per hour for the lowest paid jobs in the industry.

The following principal upward adjustments in wages have been announced since Jan. 1.

1. Correction of wage inequities and

STEEL INGOT PRODUCTION STATISTICS

	Estimated Production—All Companies								*Calculated weekly production all companies	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
1947	*Net tons	Per cent of capac.	Net tons	Per cent of capac.	*Net tons	Per cent of capac.	*Net tons	Per cent of capac.	Net tons	
Jan.	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
Feb.	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
Mar.	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st qtr.	18,989,581	95.0	1,077,901	84.8	875,312	69.9	20,942,794	93.1	1,628,522	12.86
†Apr.	6,360,294	95.4	375,675	88.6	306,844	73.5	7,042,813	93.8	1,641,681	4.29
‡May	6,633,203	96.4	372,823	85.1	326,802	75.8	7,332,828	94.6	1,655,266	4.43
1946										
Jan.	3,530,192	51.1	207,512	47.4	135,183	28.9	3,872,887	49.6	874,241	4.43
Feb.	1,301,719	20.9	25,905	6.6	65,058	15.4	1,392,682	19.8	348,171	4.00
Mar.	5,950,241	86.2	363,949	83.1	194,574	41.6	6,508,764	83.3	1,469,247	4.43
1st Qtr.	10,782,152	53.8	597,366	47.0	394,815	29.1	11,774,333	51.9	915,578	12.86
Apr.	5,336,317	79.8	286,088	67.5	238,790	52.8	5,861,195	77.5	1,366,246	4.29
May	3,702,184	53.6	153,409	35.0	217,027	46.4	4,072,620	52.2	919,327	4.43
June	5,148,660	77.0	251,253	59.2	225,860	49.9	5,625,773	74.4	1,311,369	4.29
2nd qtr.	14,187,161	69.9	690,750	53.7	681,677	49.7	15,559,588	67.9	1,195,971	13.01
1st 6 mos.	24,969,313	61.9	1,288,116	50.4	1,076,492	39.4	27,333,921	59.9	1,056,588	25.87
July	6,027,388	87.5	365,332	83.6	225,963	48.5	6,618,683	84.9	1,497,440	4.42
Aug.	6,291,363	91.1	373,837	85.4	259,322	55.5	6,924,522	88.7	1,563,098	4.43
Sept.	5,951,232	89.2	371,465	87.8	232,869	51.6	6,555,566	86.9	1,531,674	4.28
3rd qtr.	18,269,983	89.3	1,110,634	85.6	718,154	51.8	20,098,771	86.8	1,530,752	13.13
9 mos.	43,239,296	71.1	2,398,750	62.2	1,794,646	43.6	47,432,692	69.0	1,216,223	39.00
Oct.	6,312,604	91.4	387,933	88.6	251,205	53.8	6,951,742	89.0	1,569,242	4.43
Nov.	5,873,264	87.8	318,350	75.1	266,157	58.8	6,457,771	85.4	1,505,308	4.29
Dec.	5,286,799	76.7	222,704	51.0	250,998	53.8	5,760,501	73.9	1,303,281	4.42
4th qtr.	17,472,667	85.3	928,987	71.5	768,360	55.4	19,170,014	82.8	1,458,905	13.14
2nd 6 mos.	35,742,650	87.3	2,039,621	78.5	1,486,514	53.6	39,268,785	84.8	1,494,815	26.27
Total	60,711,963	74.7	3,327,737	64.6	2,563,006	46.6	66,602,706	72.5	1,277,382	52.14

* Revised January through December, 1946; † Revised. ‡ Preliminary figures, subject to revision.

establishment of 30 general labor classifications with a range of standard hourly wage rates.

2. A general wage increase of 12½ cents an hour, announced in April.

3. The granting of other employee benefits, such as a liberalized vacation program and other provisions.

Steel Payrolls Take 41 Cents of Sales Dollar

The steel industry's costs of production consumed 94 cents of each dollar which the industry received from sales in 1946, according to the American Iron & Steel Institute. After meeting those costs, all that remained of each dollar of sales was 6 cents, which was divided as follows: 3 cents for dividends to stockholders; ½ cent for interest to bondholders and 2½ cents left in the business.

Payrolls took a larger share than ever before, amounting to 41 cents.

Materials and supplies, in which the indirect labor cost is large, required 40 cents of the sales dollar in 1946; taxes took 5 cents; administrative costs 4½ cents; and depreciation 3½ cents.

Steel Product Shipments Increase In April Despite Shorter Month

Shipments of steel products increased about 2 per cent in April over the March total, despite the shorter month, and about 25 per cent over April, 1946, according to the American Iron & Steel Institute, New York.

Total shipments in April came to 5,909,714 net tons, including 463,721 tons to members of the industry for conversion into further finished products or for resale, compared with 5,798,461 tons in March, including 494,046 interchange shipments, and 4,698,081 tons in April, 1946, including 362,387 interchange shipments.

Total shipments for the first four months came to a revised total of 22,299,086 tons.

Effect of the home and car building programs was reflected in the April statistics. Shipments of the following products accounted for a larger portion of total shipments than they did in March: Plates, reinforcing bars, butt weld pipe, wire rods, drawn and barbed wire, hot-rolled sheets, hot and cold-rolled strip, standard rails and tie plates.

Those classifications which declined slightly in April included: Heavy structural shapes, skelp, hot-rolled carbon and alloy bars, cold-finished carbon and alloy bars, cold-finished and galvanized sheets.

Net shipments of hot-rolled sheets amounted to 630,700 tons in April compared with 609,747 tons in March while those of cold-rolled sheets amounted to 458,933 and 483,051 tons, respectively. Net shipments of galvanized sheets amounted to 134,701 tons in April against 136,300 tons in March; hot-rolled strip, 151,323 tons against 144,268; cold-rolled strip, 141,314 tons against 132,403.

Net shipments of hot-rolled bars totaled 827,018 tons in April compared with 834,646 tons in March while cold-finished bars totaled 158,452 tons compared with 165,740.

Other details of the report are shown in the accompanying table.

Steel Products	Number of companies	Items	APRIL - 1947 Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	APRIL - 1947 Per cent of Total Shipments	APRIL - 1947 Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	To Date This Year Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	To Date This Year Per cent of Total Shipments	To Date This Year Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Whole Year 1946 Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products For Resale) (Net Tons)	Whole Year 1946 Per cent of Total Shipments	Whole Year 1946 Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	40	1	230,849	4.2	179,319	863,401	4.2	703,956	1,949,624	4.0	1,645,748
Structural shapes (heavy)	13	2	392,032	7.2	96	1,477,423	7.2	1,075	3,474,284	7.1	5,399
Steel piling	3	3	27,316	0.5	-	107,738	0.5	23	205,313	0.4	141
Plates (sheared and universal)	29	4	554,551	10.2	18,374	1,993,215	9.8	76,077	4,152,181	8.5	250,709
Skelp	5	5	13,650	0.2	33,793	58,391	0.3	128,514	227,033	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	190,431	3.5	100	745,807	3.6	255	1,790,311	3.7	4,890
—All other	5	7	15,106	0.3	182	58,308	0.3	206	144,999	0.3	426
Joint bars	7	8	16,171	0.3	1,206	63,848	0.3	4,607	176,803	0.4	5,327
Tie plates	8	9	46,459	0.9	265	160,942	0.8	2,359	447,496	0.9	18,700
Track spikes	8	10	16,977	0.3	23	60,618	0.3	54	146,194	0.3	693
Hot Rolled Bars—Carbon	33	11	549,093	10.1	66,698	*2,104,291	10.3	263,547	5,006,859	10.3	707,991
—Reinforcing—New billet	16	12	113,593	2.1	594	* 410,696	2.0	3,033	1,048,483	2.1	7,381
—Rerolled	11	13	14,175	0.3	-	46,551	0.2	-	141,346	0.3	1,267
—Alloy	26	14	150,157	2.7	17,338	* 596,815	2.9	73,305	1,390,278	2.8	138,395
—Total	44	15	827,018	15.2	84,630	3,158,353	15.4	339,885	7,586,966	15.5	855,034
Cold Finished Bars—Carbon	29	16	136,399	2.5	1,207	541,614	2.7	2,616	1,316,579	2.7	2,428
—Alloy	25	17	22,053	0.4	206	89,421	0.4	574	196,237	0.4	1,725
—Total	35	18	158,452	2.9	1,413	631,035	3.1	3,190	1,512,816	3.1	4,153
Tool steel bars	19	19	8,923	0.2	551	33,273	0.2	1,731	96,020	0.2	371
Pipe & Tubes—Butt weld	15	20	151,860	2.8	5,428	529,020	2.6	20,574	1,276,289	2.6	45,393
—Lap weld	8	21	34,415	0.6	33	133,663	0.7	556	305,516	0.6	238
—Electric weld	10	22	82,947	1.5	522	305,887	1.5	* 2,762	674,459	1.4	591
—Seamless	11	23	184,748	3.4	11,865	697,143	3.4	50,004	1,871,540	3.8	83,441
—Conduit	7	24	12,730	0.2	993	42,128	0.2	* 3,861	98,521	0.2	2,448
—Mechanical and pressure tubing	12	25	51,788	0.9	1,511	208,438	1.0	6,065	429,180	0.9	3,478
Wire rods	22	26	59,755	1.1	30,652	* 207,780	1.0	* 111,027	679,998	1.4	346,506
Wire—Drawn	38	27	218,039	4.0	18,206	* 852,157	4.2	68,358	1,933,124	4.0	135,592
—Nails and staples	18	28	74,324	1.4	989	294,382	1.4	2,383	636,632	1.3	797
—Barbed and twisted	14	29	24,366	0.4	-	80,699	0.4	8	207,610	0.4	-
—Woven wire fence	13	30	38,295	0.7	395	137,940	0.7	1,322	383,230	0.8	-
—Bale ties	12	31	10,308	0.2	-	40,322	0.2	-	99,993	0.2	-
Black Plate—Ordinary	9	32	71,137	1.3	135	287,833	1.4	983	781,167	1.6	3,179
—Chemically treated	8	33	1,868	-	-	13,593	0.1	-	125,170	0.3	-
Tin and Terne Plate—Hot dipped	9	34	178,311	3.3	6	632,004	3.1	228	1,924,657	3.9	-
—Electrolytic	9	35	139,484	2.6	-	455,741	2.2	529	909,173	1.9	-
Sheets—Hot rolled	30	36	630,700	11.6	46,759	*2,379,150	11.6	199,735	5,521,463	11.3	421,198
—Cold rolled	17	37	458,933	8.4	1,899	*1,752,276	8.6	7,496	4,075,554	8.4	3,397
—Galvanized	16	38	134,701	2.5	65	* 525,470	2.6	129	1,462,053	3.0	1,725
—Electrical and enameling	10	39	49,961	0.9	2	184,175	0.9	307	435,170	0.9	-
Strip—Hot rolled	23	40	151,323	2.8	21,922	577,152	2.8	102,424	1,363,812	2.8	237,176
—Cold rolled	33	41	141,314	2.6	2,385	515,978	2.5	10,521	1,282,146	2.6	25,904
Wheels (car, rolled steel)	5	42	30,699	0.6	2	123,257	0.6	2	252,308	0.5	348
Axles	5	43	16,052	0.3	-	59,287	0.3	53	130,461	0.3	221
All other	-	44	-	-	-	-	-	-	6,266	-	-
TOTAL STEEL PRODUCTS	141	45	5,445,993	100.0	463,721	*20,447,827	100.0	*1,851,259	48,775,532	100.0	4,297,889

During 1946 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

General Motors Equipment List Expected Soon

Major buying program seen by Transmission Division for proposed expansion of Hydra-Matic drive production

DETROIT

MACHINERY circles are expecting a major equipment buying program from the General Motors Transmission Division in connection with a large expansion of production of the Hydra-Matic drive to make it available on Buick and Pontiac models next year. The program would involve a complete line of production machining equipment, gear hobbers, gear shavers, conveyors and many other items.

A new plant likewise would be necessary since the present location of the division has inadequate facilities or room to handle a major expansion. There has been some discussion among GM executives of locating the plant at Cleveland, possibly completing the buildings which had been projected there for the Chevrolet light car manufacturing activity, now abandoned.

A more likely prospect, however, is the naval arsenal plant here in Detroit, comprising a number of modern buildings specially equipped for a wide range of machining operations. This plant is now idle, and practically none of the machinery has been removed. The navy eventually is likely to permit the plant to be declared surplus. Location and facilities are considered ideal for something like the GM automatic transmission project.

A scattering of die work for new Chrysler models has appeared in some of the local shops, although as yet it is too small in volume to represent any full-scale model change.

With automobile doors growing wider and heavier and still further increments expected in 1948 models, the plan to change hinge assemblies from malleable castings to drop forgings is not surprising. This will call for new forging equipment, but activation of the program is still some months away.

Upholds Lincoln Electric Co. in Incentive Tax Case

United States Sixth Circuit Court of Appeals at Cincinnati last week reversed a ruling by the Tax Court of the United States which had disallowed deductions on income tax returns for 1940 and 1941 made by Lincoln Electric Co., Cleveland, in connection with its employee incentive plan. The decision is viewed as highly significant and with broad implications for other firms operating employee incentive plans.

In those years Lincoln deducted from gross income premiums upon an employees' retirement annuity policy taken out in 1936 and also in 1941 deducted a payment into a trust for the benefit of its employees. The Commissioner of Internal Revenue, who was sustained by the Tax Court, disallowed the deductions on the grounds that they were not "ordinary and necessary expenses paid . . . in carrying on any trade or business, including a reasonable allowance for salaries or other compensation for personal services actually rendered," which is the definition of gross income contained in the Internal Revenue Code.

In its decision the Circuit Court pointed out the Lincoln company through its treatment of employees had avoided labor troubles, increased earnings and reduced prices on its products, so that its employee payments could be considered ordinary and necessary to carry out its business. The Court also indicated that the commissioner had not disallowed similar deductions made by Lincoln in 1936 through 1939. Finally, the court stated that other incentive plans for the preservation of industrial peace might be thwarted by the decision of the Tax Court if it were allowed to stand.

Malleable Founders Warned Of Danger Signs Ahead

Some of the problems facing the malleable iron industry today, and certain remedies for them were pointed out by Frank E. Shumann in his presidential address at the annual meeting of the Malleable Founders' Society held at Hot Springs, Va., June 5 and 6.

Mr. Shumann, who is president, Lehigh Foundries, Inc., Easton, Pa., discussed danger signals now apparent to industry and indicated too much complacency may prevail in connection with order backlogs for castings. He said storm warnings may be present in the price situation and that a decline of 10 per cent in industrial activity may mean the difference between profit and loss in many foundries.

The meeting marked the 50th anniversary of the malleable group which was a predecessor to the present organization.

Numerous other speakers on the program discussed various phases of the society's activities. Included was an address by Frank G. Steinebach, editor, *The Foundry*, who discussed development and scope of activities of the National Castings Council.

WAA Orders Certain Special Tools Scrapped

Government disposal agency lists unsalable special machinery. Equipment described as to types

UNDER a new ruling, the War Assets Administration has listed certain government-owned machine tools as "unsalable special machinery to be disposed of by the owning agencies as scrap or salvage."

The machines, identified as to types and the names of the makers, are:

Avery Drilling Machine Co.: No. 4 drills.
Baird Machine Co.: 5-spindle continuously turning machines.
Baker Machine Co.: Single-end horizontal bomb manufacturing machines: No. 3½ and No. 24 floor type, horizontal bomb manufacturing machines. Two-way combination machines—bomb manufacturing machines.
E. W. Bliss Co.: No. 4, 6, 7 headers.
Black Rock Mfg. Co.: 6" Cannelure slotting machines.
Cleveland Automatic Machine Co.: Special purpose Model B machines.
James Coulter Machine Co.: Model T-1, T-3, T-5 and T-6 cartridge machines.
Cross Gear Machine Co.: Nos. 6, 7, 8, 9 and 10 special shell-making milling machines.
Crown Machine & Tool Co.: 3"-6" shell lathes
Charles F. Elmes Engineering Co.:
  Special cartridge case presses.
  Special nosing presses.
Engineering and Research Corp.:
  75-ton stretching press.
  150-ton stretching press.
  300-ton stretching press.
  Propeller profiling machines.
Fellows Gear Shaper Co.: Discing shapers.
Ferracute Machine Co.: Horizontal toggle and crank, 50-gal. ammunition press.
Greenlee Brothers Co.: Automatic, horizontal, vertical and angular, hydraulic feed, multiple operation, single purpose, special indexing machines.
Henry & Wright Co.: Primer inserting machines.
Hepburn-American Co.: Shell lathes, sizes A, B, B-heavy duty, and C.
Jones & Lamson Co.: Supercharger bucket grinders.
Landis Machine Co.: "Landmaco" shell tappers—models 1½R, 1½RR, and 1½H.O.
Lehmann Machine Co.: All 24" special shell making hydrotel lathes.
Lipe Rollway Corp.: Shell lathes, models B120, B140 and B100.
New Britain Machine Co.: Model 49 chucking machines.
Seneca Falls Machine Co.: Lo-swing lathes, Model LS and special models U and LS.
Sparks Simplex Engineering Co.: Hydromatic simplex lathe for 75-155 m.m. shells.
Sundstrand Machine Tool Co.:
  Angular sliding head mills.
  Duplex spot face mills.
  Impeller mills.
  Muff mills.
  Planetary mills.
  Sliding head mills.
  Special end mills.
  Special single purpose aircraft engine production milling machines:
    Mill type planers.
    Slotting machines.
    Table type milling machines.
    Vertical milling machines.
  Swivel rotary mills.
Van Norman Machine Tool Co.: No. 100 contour milling machines.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Congressional sentiment for strong national security measures mounts as result of Communist coup in Hungary. Chance for early consideration of security bills increased with possibility summer adjournment of legislators may be postponed

SIGNS are beginning to accumulate that the coup by which the Communists seized the government of Hungary and at one stroke added that republic to the satellites already behind the iron curtain of the U. S. S. R. may herald an important change in United States foreign policy.

President Truman's characterization of this new piece of chicanery as an "outrage" was representative of the majority feeling in government, and especially on Capitol Hill. A lot of moves may come out of it. There now is serious talk to the effect Congress will not go home toward the end of July as expected but may stay on through the summer to enact legislation aimed at providing for greater national security.

The prevailing temper was shown when Representative Dirksen, on the basis of the likelihood that the Army's enlistment estimates will not be reached this year, moved to lop $125 millions off the military establishment appropriation by cutting off 30,000 enlisted men and 5000 officers. "For God's sake don't weaken our defense now," shouted Rep. Dewey Short (Rep., Mo.), whereupon the House rejected the amendment by voice vote. It immediately followed by restoring $40 million for the purchase of aircraft by the Army Air Forces.

Unification of Forces Favored

Abandoning an earlier disposition to postpone consideration of the National Security Act until 1948, the Senate Armed Services Committee, following a vote of 12 to 0, reported favorably a bill to place the nation's military forces under one direction. With minor changes, it accords with the compromise measure worked out by the Army and Navy and recommended by President Truman. The Republican leadership has it on the Senate calendar for debate in late July—and it is expected to be approved. A similar measure has been the subject of hearings by the House Committee on Expenditures in the Executive Departments which will soon file a report.

A popular feature of the Senate bill, incidentally, is that it guarantees that the Marine Corps will suffer "no alteration or diminution" of its relative status.

In transmitting to Congress the recommendation of the Compton commission for a universal military training system under which all able-bodied young men at 18 or upon completion of their high school courses would be required to serve six months in camp or at sea, with an additional six months in reserve component of the armed forces or its equivalent, the President urged prompt action. There now is a likelihood of enactment of a universal military training law this year. First, there has been a revulsion among lawmakers from the "bring the boys home" slogan that brought almost total demobilization in the months following World War II. Second, there is a general realization that universal military training is necessary for the national security, and there is a disposition among some Republican leaders to get the matter out of the way now instead of letting it hang over to become, possibly, a campaign issue next year.

Emphasis on military awareness is reflected in many ways in Washington.

It is found in Secretary Forrestal's annual report to the President which stresses the importance of the Navy's research program. More and more, says the report, the Navy is pushing basic research so as to develop new types of weapons rather than seek improvement of existing ones.

It is found in a new so-called "minute man of industry" program inaugurated by the War Department. In the present phase, the program is not of immediate significance to the metals industries but it may become so later on. The purpose is to organize and train, now, service units of many different types which will be ready to go into action in an emergency and which will serve as nuclei for immediate expansions. Units now being organized are in the fields of medicine, hospitalization, railroad and truck transportation, and in communications. Later on other fields of civilian activity will be organized.

It is found in a National Inventors Council program being pushed by the Commerce Department. It calls for solution of 25 technical problems that offered difficulties in World War II. Here are some of the inventions wanted: 1—Storage batteries for low temperature operation; 2—low-horsepower gas turbines; 3—ultra lightweight gasoline power units; 4—new types of fuels and lubricants; 5—lightweight, high-strength, non-corrosive structural metals; 6—corrosion-protection of electrical equipment; 7—standby heaters; 8—improved power transmissions; 9—gliderborne lifeboats; 10—a line-throwing gun; 11—a continuous sampling combustible gas indicator; 12—a lightweight, high-speed diesel engine, etc.

It is found in administration orders to the Atomic Energy Commission to step up the tempo of atomic research in all its phases.

It is found in the House Appropriations Committee's action in reporting the full amount asked for the War Department's research and development work in fiscal 1948—$222,216,400. The present stress on the importance of scientific effort probably will bring about House approval of the Senate-passed National Science Foundation bill before the end of this session.

Foreign Trade Agency Opposed

Following investigations by the House Ways & Means and other congressional committees, and by recent enactment of a wool support bill now in the hands of a conference committee, a real fight against the administration's plans in preparing to set up an International Trade Organization may be started by the Senate Finance Committee. Chairman Milliken said members of his committee do not like the way things are going at the organizational conference at Geneva and may call for a stay on entering into binding commitments at Geneva and until Congress has had a chance to study and revise our present foreign trade policy. A bipartisan majority of the committee feels that American interests are not being adequately protected at Geneva.

Tin Smelter Operation Urged

The Senate Banking & Currency Committee last week approved a bill introduced by Sen. John W. Bricker (Rep., O.) extending to June 30, 1949, the government's authority to operate the government-owned tin smelter at Texas City, Tex. As in the past the plant will be operated by Reconstruction Finance Corp. or some other agency designated by the President.

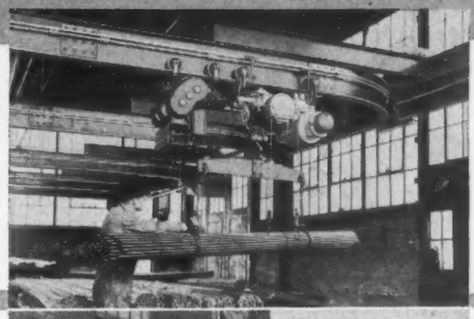
RFC officials were seconded by State and Commerce Department and Army-Navy Munitions Board spokesmen in contending continued operation of the smelter is necessary to national security and to peacetime industry.

C. A. Ilgenfritz, vice president in charge of purchases, United States Steel Corp., New York, on the basis of information gained at the recent Brussels International Tin Conference, told the

MONORAIL PAYS!!

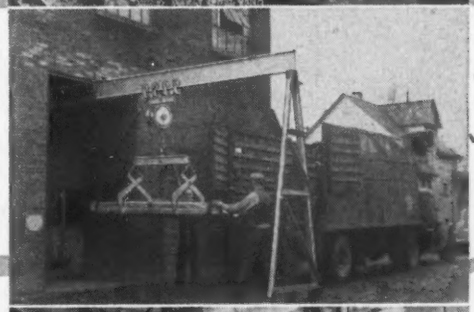
PRODUCTION INCREASE
From 26 to 48 tons per day.

By furnishing definite overhead routes for the movement of bar stock, congestion was eliminated. Free flow of materials to production machines nearly doubled their output.



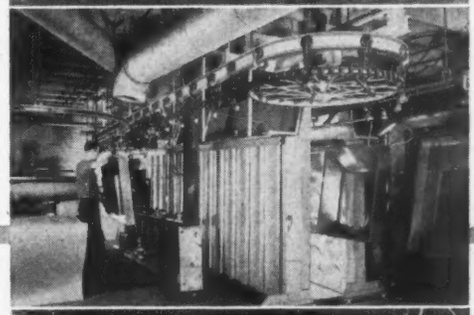
HANDLING COST
Saving of $150 in 4 months.

Transfer of sheet metal from truck to storage is costly when handled sheet by sheet. A simple system such as this actually saved $150 in handling cost within four months.



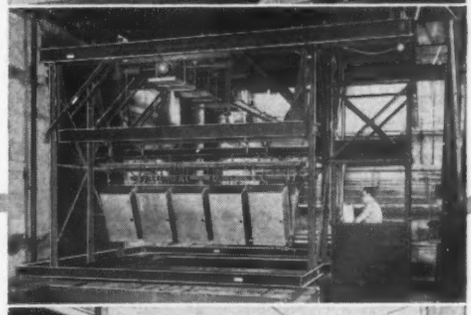
TIME SAVED
Drying time reduced 70%

Passage of metal furnace parts through infra-red dryers cuts 70% from the time formerly required for drying. This operation on monorail also eliminates costly handling labor.



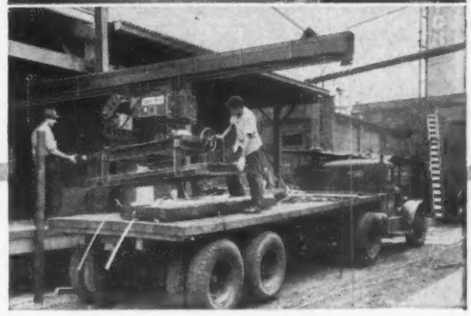
INCREASED CAPACITY
30% more units moved through process

Nearly a third more units can be handled from tank to tank throughout the cleaning process. All handling is controlled from cab by a single operator.



LABOR SAVED
Unloads truck with 26 less man hours.

Operators claim to save $20 per truck over former unloading costs. With power operated equipment and special grab for handling 2-ton loads, complete safety is assured.



Let an American MonoRail Engineer explain how similar savings can be made in your handling methods. Write for Bulletin C-1 showing successful applications.

THE AMERICAN MONORAIL COMPANY

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PEACE TREATIES RATIFIED: First four of World War II peace treaties have been ratified by Senate. Above, Sen. Arthur Vandenberg looks on while Senate Secretary Carl Loeffler signs the pacts with Italy, Rumania, Bulgaria and Hungary. NEA photo

subcommittee the supply of tin is going to be short for several years—chiefly because of the great damage done to tin smelters and tin properties in the Far East during the Japanese invasion.

"On Jan. 1, 1949, world stocks of tin will be down to 64,000 tons, compared to a potential annual world requirement of 190,000 tons—enough for about four months on the basis of potential demand," said Mr. Ilgenfritz. "Some authorities expect world consumption eventually will go to 250,000 tons annually. The situation is such as to make continued operation of the Texas City smelter essential."

Questioned about the current 80-cent tin price in the United States, Mr. Ilgenfritz thought it was high and hoped it might go lower.

However, it was brought out by other witnesses that the cost of producing Bolivian concentrates is high, so that cost of producing tin at Texas City can be reduced only by using alluvial tin ores from the Far East—Netherlands East Indies, Siam and Malaya—to a considerable extent. It was disclosed that the RFC recently contracted with the Netherlands East Indies for 25 per cent of the alluvial concentrates produced in 1947 by the Billiton and Banka companies.

Morris Levenson and J. C. Johnson, of RFC's Office of Metals Reserve, estimated that the Texas City smelter will produce in calendar 1947—assuming that Congress extends the present operating authority beyond the June 30 expiration date—between 30,000 and 40,000 tons of tin. This, it was brought out by Erwin Vogelsang, chief of the Tin, Lead & Zinc Section, Office of Metals Distribution, Commerce Department, will be augmented by some 30,000 to 35,000 tons of imported tin. Even so, it was said, the supply will be short. Mr. Johnson estimated total United States demands in 1947 as something between 80,000 and 110,000 tons. Mr. Levenson used the term "acute shortage" in describing the tin supply situation in the United States in 1947 and 1948.

Ethelbert Warfield, chairman of the Tin Processing Corp., New York, the United States agent of the Billiton company, said his company would be interested in working out an arrangement to operate the Texas City smelter on a permanent basis, and on the basis of low-cost alluvial ores from the Netherlands East Indies, provided that the United States government will provide a tariff or other needed protection. The Tin Processing Corp., it was disclosed, whose present contract for operating the Texas City smelter on behalf of the RFC will expire June 30, 1947, is to have its contract extended for one year if Congress acts to extend the RFC authority to operate Texas City.

Action on the tin resolution will be taken by the Senate Banking & Currency Committee after it decides the prior question as to whether the RFC will be continued in operation beyond its present June 30, 1947, expiration date.

WAA Scrap Hearing Likely

Long deferred investigation of complaints that the War Assets Administration has been slow about marketing scrap and potential scrap may take the form of a series of hearings to be conducted late in June by the Rizley Surplus Property Subcommittee of the House Committee on Expenditures in the Executive Departments. The subcommittee now is preparing a comprehensive report of findings in the hearings it so far has conducted this year, and will get into the matter of scrap after this report has been completed.

The Ferguson Surplus Properties Subcommittee of the Senate Committee on Expenditures in the Executive Departments expects shortly to resume its hearings on machine tool sales of the War Assets Administration. The hearings were interrupted in order to enable staff men to conduct some additional investigations.

Federal Payroll Shrinks

According to a check by the Civil Service Commission, the number of employees on the government payroll has been reduced from a wartime peak of 345,000 to a present total of 225,000. A further drop to 200,000 is possible but on the basis of the appropriation picture it will not go any lower than that figure.

Civilian employees have decreased from 287,244 in February of 1944 to 217,984 as of April 1, 1947. Navy military personnel in Washington, including Waves, officers and enlisted men and women has declined from 37,725 on June 30, 1945, to the present number of 7000. War Department military personnel has declined from 26,000 as of June 30, 1945, to the present 4418.

Machinery to the Rescue

As in most human activities in the world of today, the joint campaign of the United States and Mexican governments to stamp out foot-and-mouth disease in the Latin republic will be fought mainly with machinery. Ninety carloads of heavy machinery already have been sent to the old National Agricultural College in Mexico City with more to come. Included are: 10 track-type gasoline-powered, ½-cubic yard shovels to dig burial pits; 10 bulldozers to be used for quick burial of slaughtered animals; 100 jeeps for quick transportation of personnel and light supplies; 121 high-wheeled motor trucks for use over high-crowned or rutted roads; 3 mobile offices for paymasters who will recompense owners for condemned animals; 3 tank trucks for carrying disinfectants; 22 mobile spray units; 5 semi-trailers for hauling shovels and bulldozers, etc.

A carload of assorted machine tools from San Francisco will be set up in a shop for the maintenance and repair of field equipment.

Portal Pay Act on Statute Books But Faces Test in the Courts

Constitutionality of new law to be defended by the Department of Justice in legal fight planned by two labor unions. Enacted measure differs in many respects from bill as it was originally introduced

THE Portal-to-Portal Act of 1947 now is on the statute books as Public Law 49, 80th Congress, but it still has to run the gamut of the courts. Two unions, the longshoremen on the West Coast, and the stevedores in New York city, will seek to have it overthrown.

The Department of Justice will defend its constitutionality. This is because the two union suits are against cost-plus contractors, so that damages would have to be paid out of the United States Treasury. In fighting these cases, Justice proposes to rely both on the Portal pay law and on the de minimis principle which, as defined in the recent Mt. Clemens decision, calls for throwing out claims based on trifling amounts of compensation per day or week.

In view of the numerous changes that were made in the Portal pay bill from the time of its initial introduction until it emerged from the House-Senate conference committee and was speeded to the White House, an analysis of the bill as it was finally enacted into law should prove of value to employers against whom portal pay suits have been brought in the past or against whom they may be brought in the future.

While the abuses that were responsible for the Portal pay bill developed under the Fair Labor Standards Act of 1938, as amended, it was determined that the same abuses may occur under the Walsh-Healey and Bacon-Davis Acts. Therefore, the Portal-to-Portal Act of 1947 applies to actions that have been brought or may be brought under any of these three acts.

Public Law 49 has "existing claims" and "future claims" sections.

The "existing claims" section provides that no employer shall be subject to any liability or punishment under any of these three acts in minimum wage or overtime cases "except an activity which was compensable by either (1) an express provision in effect at time of such activity between employer and employee, or (2) a custom or practice in effect at the place where the employee was employed. Further, to qualify as compensable, the activity must have been performed during the portion of the day during which, in accordance with the contract or custom, it was made compensable.

The section expressly prohibits all courts—federal, state, territorial, District of Columbia, etc.—from exercising jurisdiction over any action, whether instituted prior to or after the date of enactment of the act, that involves claims not included in the foregoing description.

This portion of the act also contains a provision under which existing claims may be settled by compromise in whole or in part "if there exists a bona fide dispute as to the amount payable by the employer to his employee." The law stipulates, however, that no compromise may be based on an hourly wage rate less than the minimum required under the Fair Labor Standards Act, or based on less than time-and-a-half pay for overtime.

The "future claims" section also validates claims for compensation based on an express contract between employer and employee, or on plant custom or practice. It then goes on to specify those activities which are noncompensable, as follows: (1) walking, riding or traveling to and from the actual place of performance of the principal activity or activities which such employee is employed to perform, or (2) activities which are preliminary to or postliminary to said principal activity or activities.

Important Features

A number of important features of the Portal pay act are embodied in a "miscellaneous" section, as follows:

1—No employee shall be a party plaintiff in wage liability suits without his written consent.

2—Minimum wage or overtime pay actions in which the cause of action accrues on or after the enactment of the act—May 14, 1947—must be brought within two years of the cause of action or be forever barred. However, if the cause of action accrued prior to May 14, the action may be commenced within whichever of the following periods is shorter: two years after the cause of the action accrued, or the period prescribed by the applicable state statute of limitations.

3—No employer shall be found liable in minimum and overtime pay cases where he can prove that he acted "in good faith in conformity with and in reliance on any administrative regulation, order, ruling, approval, or interpretation, of any agency of the United States, or any administrative practice or enforcement policy of any such agency with respect to the class of employers to which he belonged."

4—The courts are given discretionary authority to waive liquidated damages in wage cases when convinced that the employer acted on good faith and believed that he had "reasonable grounds" for believing that his act or omission was not a violation of the wages-and-hours act.

The Portal-to-Portal Act of 1947 is noteworthy for the minute detail in which the intent of this law is described. Because of the importance attached by the courts to the intent of Congress this section is worth quoting in full:

"The Congress hereby finds that the Fair Labor Standards Act of 1938, as amended, has been interpreted judicially in disregard of long established customs, practices, and contracts between employer and employees, thereby creating wholly unexpected liabilities, immense in amount and retroactive in operation, upon employers with the result that, if said act as so interpreted or claims arising under such interpretations were permitted to stand, (1) the payment of such liabilities would bring about financial ruin of many employers and seriously impair the capital resources of many others, thereby resulting in the reduction of industrial operations, halting of expansion and development, curtailing employment, and the earning power of employees; (2) the credit of many employers would be seriously impaired; (3) there would be created both an extended and continuous uncertainty on the part of industry, both employer and employee, as to the financial condition of productive establishments and a gross inequality of competitive conditions between employers and between industries; (4) employees would receive windfall payments, including liquidated damages, of sums for activities performed by them without any expectation of reward beyond that included in their agreed rates of pay; (5) there would occur the promotion of increasing demands for payment to employees for engaging in activities, no compensation for which had been contemplated by either the employer or the employee at the time they were engaged in; (6) voluntary collective bargaining would be interfered with and industrial disputes between employees and employers and between employees and employees would be created; (7) the courts of the country would be burdened with excessive and needless litigation and champertous practices would be encouraged; (8) the Public Treasury would be deprived of large sums of revenues and public finances would

be seriously deranged by claims against the Public Treasury for refunds of taxes already paid; (9) the cost to the government of goods and services heretofore and hereafter purchased by its various departments and agencies would be unreasonably increased and the Public Treasury would be seriously affected by consequent increased cost of war contracts; and (10) serious and adverse effects upon the revenues of federal, state and local governments would occur.

"The Congress finds that all of the foregoing constitutes a substantial burden on commerce and a substantial obstruction to the free flow of goods in commerce."

Of interest to employers are certain warnings contained in the message in which President Truman explained his signing of the bill.

Employers must not lose sight of the important requirement under the act, he said, that "all principal activities must be paid for, regardless of contract, custom or practices. I am sure the courts will not permit employers to use artificial devices such as the shifting of work to the beginning or end of the day to avoid liability under the law."

In referring to the so-called good faith provision, the President warned that the act in no sense makes an employer the judge "of whether or not he has been guilty of a violation." He must show that there was an affirmative action by an administrative agency and that he relied upon and conformed with such action.

The President also said that the act "introduces new and possibly ambiguous language, the effects of which can be accurately measured only after interpretation by the courts."

Finally, the President told the economy-minded Congress, enactment of the Portal Pay Act would make necessary additional appropriations for the administration and enforcement of the wage-and-hours laws. "The 2-year statute of limitations under this act will in most cases substantially reduce the period of time within which workers' claims may be asserted under the wages-and-hours law," he said. "It will be necessary, therefore, to augment the government's program of inspection and enforcement. . . Other provisions of this act also place undue additional responsibilities upon the Department of Labor. I shall submit estimates to the Congress for the necessary appropriations."

CED Report Suggests Aid For Small Business Firms

"The number one problem of small business is management," is the conclusion reached in a report by the Research & Policy Committee, Committee for Economic Development.

In its *Meeting the Special Problems of Small Business*, the committee states 98 per cent of all business units in the country come within the ranks of small business and that more failures are due to lack of skill in running the project than to any other cause. The committee examines the problems of small business concerning financing and taxation and competitive opportunity.

The report urges more management aid to small business which does about 35 per cent of the total dollar volume of business and accounts for 45 per cent of all people employed, according to census figures for 1939.

It advocates the Commerce Department set up a clearing house for government services and information because of the complexity of government regulations, specifications and tax laws. The committee feels there is a large field open for management-counseling firms which offer part-time services at reasonable cost, and it also advocates additional guidance from trade associations, advisory services from suppliers, community programs to improve business efficiency, special courses and research in schools and colleges and greater availability of research findings.

Attacks Unsound Financing

In the field of financing and taxation, the committee is especially concerned over what it terms "unsound financing arranged in the last few exceptionally prosperous years." Over the past dozen years, it states, the bankruptcy rate among small businesses has been only one half of 1 per cent of the 3,250,000 in existence, but that a very small rise in this rate would have disastrous effects on the nation's economic well-being.

In its study of taxation the committee makes five recommendations:

1. There should be general reduction of both business taxes and personal income taxes.

2. Both corporate and non-corporate businesses should have the right to carry forward losses from business operations to apply against subsequent earnings for a period of six years.

3. The tax burden should be equalized by permitting tax payers to average their income tax over a period of years to reduce present discrimination against those with irregular incomes.

4. Greater latitude should be given both corporate and non-corporate business in making annual allowances for depreciation.

5. Double taxation of corporate income should be eliminated.

In its suggestions for the improvement of competitive opportunity, the committee advocates removal of all interstate trade barriers in the form of licenses, special taxes and quarantine devices. The report also studies existing federal legislation relating to competition and suggests that the Sherman Anti-Trust Act, Miller-Tydings Amendment, Clayton Act, Federal Trade Commission Act, Robinson-Patman Act and all others be re-examined and recast into a consistent body of legislation that clarifies objectives. In regard to labor relations, the committee reveals that small businesses for the most part are not unionized, but that in many cases where they are, we find the nation's best examples of co-operative and harmonious union-management relations.

Admiral Moreell Goes on Industrial Hygiene Board

Election of Admiral Ben Moreell, USN (Ret.), to the Board of Trustees of Industrial Hygiene Foundation, Pittsburgh, focuses attention upon the active participation of the steel industry in the foundation's program for advancement of employee health.

With election of Admiral Moreell, new president and board chairman of Jones & Laughlin Steel Corp., there are now three representatives of the steel industry on the foundation's board. Others are H. G. Batcheller, president, Allegheny Ludlum Steel Corp., and R. E. Zimmerman, vice president, United States Steel Corp.

Justice Department Looks Into 1941 Allis Strike

Department of Justice attorneys are examining the record in the Allis-Chalmers strike investigation of the House Committee on Education & Labor to determine what legal action to bring against UAW-CIO officials who, according to the committee, engineered the strike of 1941 "at the direction of the Communist Party and for the purpose of carrying out its program."

"Allis-Chalmers," the report says, "was selected by the leaders of the Communist Party as a focal point for the 1941 strike because of the important work it was doing for the Navy."

The committee recommended the Justice Department take whatever steps "the evidence warrants" but demanded that it prosecute two UAW officials for giving "false testimony during the committee's investigation." The subcommittee investigated only the 1941 strike; it did not have authority to investigate the 328-day walkout which ended when the workers on March 23, 1947, returned without a contract.

French Suggest Import Duties Replace All Other Restrictions

Plan may be submitted to International Trade Conference providing for tariff ranging from 8 to 18 per cent on iron and steel products. France seeks agreement with Netherlands to obtain Dutch blast furnace coke

PARIS

THE FRENCH government is reported preparing to submit a plan to the International Trade Conference at Geneva under which import duties would be submitted for all other restrictions on imports of iron and steel. The duty proposed would be 8 per cent on pig iron, 15 per cent on semifinished steel and from 15 to 18 per cent on finished steel products.

The automobile factory of Etablissements Berliet was taken over by a committee of workmen at the time of the liberation. A fine of 143 million francs ($1,190,000) was imposed upon the original owners for illicit profits made during the war. The French government, through the Commission de Production Industrielle, has decided to take over all the shares of the company in payment of the fine.

France is planning to arrange an agreement with the Netherlands to obtain Dutch blast furnace coke. If France received sufficient coke from the Ruhr and other countries it would then be possible for the French industry to supply steel to Germany and the Netherlands.

Great Britain

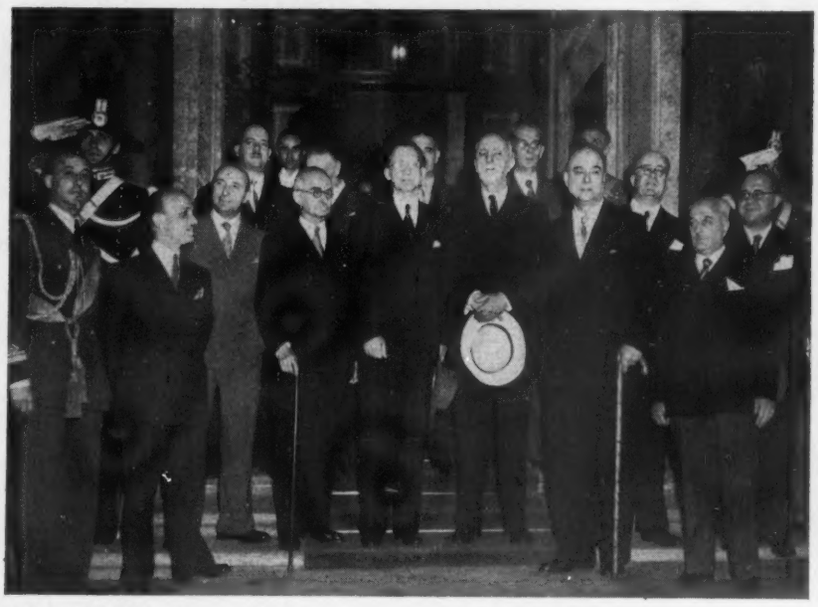
Pig iron prices increased May 2. For foundry and forge pig iron the increase amounts to 5s ($1.00) per ton, delivered in Scotland, and 2s 6d ($0.50) for the North East coast. For cylinder and refined irons the increase is 8s ($1.60) per ton. There have also been increases for sizes and extras for steel products.

Netherlands

The new plate mill at Yjmuiden is near completion and is on the point of starting operations with an anticipated output of 160,000 tons per annum.

Italy

Italy continues to be hampered by the lack of imports of coal, coke and semifinished steel which, before the war, came from Germany. Despite this disability the present output of pig iron has reached about 75 per cent of the average level in the period 1935-37, and for steel ingots production is about 90 per cent.



NON-COMMUNIST CABINET: Italy's new government, seventh since the liberation, is the first to exclude Communists, second most powerful political party in the country. It is headed by Prime Minister Alcide de Gasperi, fifth from left in front row, head of the Christian Democrat (Catholic) party, and includes nine Christian Democrats and five independents. Formation of the non-Communist cabinet is interpreted as a move to win favorable consideration for an American loan to Italy. NEA photo

Austria

The blast furnace at the Hermann Goering works at Linz, which was closed earlier in the year owing to lack of coke, has been put back into operation, a guaranty having been given that coke would be supplied from the Ruhr.

Czechoslovakia

Production of iron and steel during the first quarter of the year exceeded slightly the planned output, the figures being: Pig iron 338,089 metric tons (100.79 per cent), steel ingots and castings 688,020 tons (102.26 per cent) and rolled products 402,394 tons (106.13 per cent).

Poland

Polish iron and steel sales syndicate is reported to have released 22,000 tons of pig iron for sale to the United States, Sweden and Italy. In the first two months of this year the Polish works produced 107,597 metric tons of pig iron, 204,034 tons of steel ingots and 150,180 tons of rolled products.

Russia

Production of pig iron in Russia in 1945 is estimated to have been 17 million metric tons and that of steel ingots and castings 18 million tons. From the official report on the first year of the Soviet's fourth five year plan, it would appear that, for the iron and steel industry, as a whole, production has attained 99.5 per cent of the plan. Output of pig iron in 1946 was 112 per cent of the output of 1945, the output of steel ingots was 109 per cent of the 1945 figure, and for rolled products the output corresponded to 113 per cent of 1945. At present, 51 per cent of the Russian iron and steel industry is east of the Urals, and goes right into Siberia.

Scandinavia

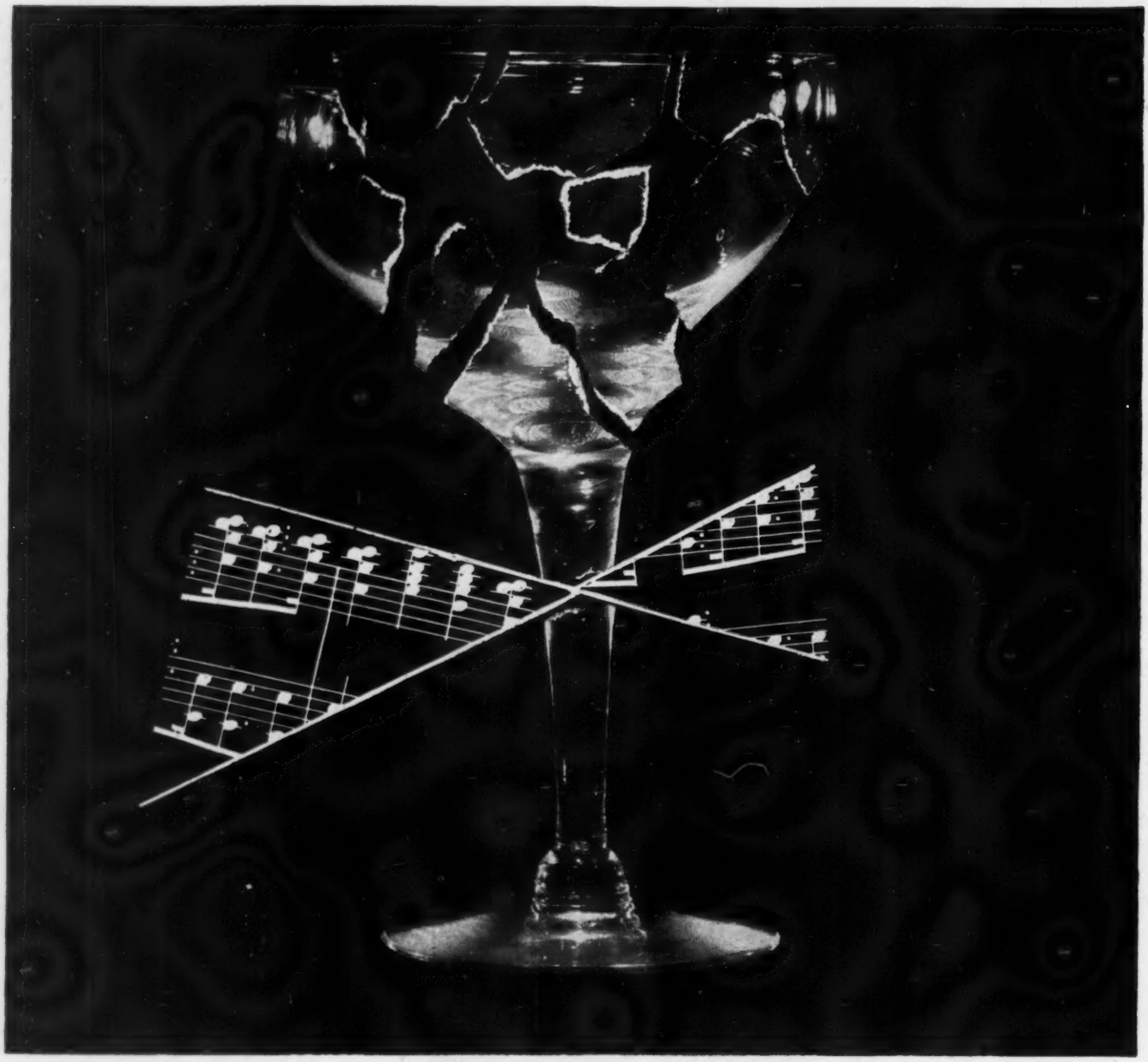
Exports of Swedish iron ore for the first quarter of 1947 totaled 1,302,000 metric tons, compared with 861,000 tons in the corresponding period of last year. Exports of iron and steel dropped from 34,100 tons to 23,000 tons. Imports of pig iron were 21,000 tons, against 26,400 tons in the corresponding period of 1946.

A FEW NOTES TO REMEMBER

It is possible to shatter a wine glass with a sustained musical note because the glass is too brittle to distribute the peak stresses that are set up by resonance.

For the same reason, failure can result in a brittle steel, with far more serious consequences than a mere broken glass.

One way to increase safety factor and to obtain many other advantages, is to specify temper-brittle-free molybdenum steels. These *modern* steels, which also provide good hardenability, good strength-weight ratio, and economy, are permitting many users to simplify—and save. Write for practical data



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CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Auto builders disturbed by public resentment over alleged sharp practices of dealers and used car sellers in loading new vehicles with unwanted accessories and charging more than list prices. Many buyers reselling cars for profit

DETROIT

MOTOR vehicle producers make no bones about being plenty disturbed over rising customer complaints on alleged sharp practices by dealers and used car retailers. Gripes center principally on charges of "loading" cars with unwanted accessories and so-called black market operations involving underallowances for used cars and overcharging for new cars and low-mileage used cars. Exhaustive investigations have been under way for months by the principal manufacturers but, just as in the case of the much-publicized "gray" market in steel sheet and strip, when the allegations are finally run down to their source they prove to be pretty largely conversation, or repetition of what some friend-of-a-friend told the complainant.

It is of course no secret that low-mileage 1946 and 1947 model cars and trucks are being sold on used car lots at prices well beyond the factory list figures on the same cars. There is nothing illegal in this, principal reason for the situation being that anxious buyers are willing to pay more than the factory list prices for prompt delivery.

More Production Is Answer

The only sound answer to the problem is more production to build up stocks of new cars so that customers will be able to buy a brand new car at the factory price and will not be tempted to pay $500 or $600 more for a low-mileage used car on a lot. Meanwhile, every effort is being made by manufacturers to check carefully on abnormal distribution practices, to work with dealers to eliminate these practices and to revoke franchises of dealers proved guilty of black market operations. The latter is not the easiest thing to do, and checks made thus far have convinced manufacturers virtually 99-44/100 per cent of their dealers are beyond reproach. There have been perhaps only a handful of cases where franchises have been withdrawn, plus a few more which will not be renewed when they expire.

Most new cars are distributed on the basis of allocation plans designed to provide as equitable treatment as possible between major geographic areas and population centers. In various communities, dealers themselves have voluntarily set up local plans of distribution to war veterans and essential users such as doctors, nurses, public safety officials, etc., to obtain new cars. Unfortunately, even many of these purchasers have succumbed to the temptation to sell their new cars at handsome premiums, even though they were given preferential treatment. There is little either manufacturer or dealer can do about that.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	442,242	140,738
April	449,228*	248,108
May	389,829*	247,620
June		216,637
July		331,000
August		359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* Preliminary.

Estimates for week ended:

May 24	96,651	53,020
May 31	79,315	33,895
June 7	98,643	45,043
June 14	100,000	50,206

Here are five cases from the files of manufacturers making detailed investigations which have cost thousands of dollars and many hours of time:

1. A South Carolina distributor delivered a new car to the mayor of the city, not specifying a used car to trade in. Shortly after taking delivery, the mayor sold his car to a used car dealer at a profit of $1300, and then returned to the distributor to see how soon he could get another model.

2. A dealer met a beautiful blonde young woman at a social function. Not knowing his identity she boasted of having made $500 by reselling an automobile two hours after she bought it from his agency. She followed this one by claiming to have netted $15,000 by getting on many dealers' lists for new cars and reselling immediately upon delivery.

3. A clergyman in Chicago, who had placed multiple orders around the city, denied to a dealer he had received delivery of a single new car. However, the dealer's subsequent investigation showed the man had obtained 13 new cars over a period of time and was selling them through a used car lot the minister had himself set up for the purpose.

4. An Indiana distributor delivered a new convertible coupe to the president of a chain store company. Eight days later the convertible was on a used car lot in a Michigan city—with a very fancy price tag.

5. An official of a midwestern bank pleaded for early delivery of a station wagon. After receiving it, he set off for a vacation in Arizona. At Fort Wayne, Ind., he sold the car at a fabulous price, purchased another for less money and proceeded on his way with enough profit to finance his vacation.

Cases All Follow Pattern

These are but a handful of case histories from files containing literally hundreds and hundreds of similar and even more fantastic examples. They all follow the same pattern—buyers selling ther much-wanted new cars for appreciable profit simply because someone would put the cash on the line. They are confined to no single geographical area, to no particular group of dealers, to no single make of car. They substantiate the conclusion of manufacturers that large sections of the public are convinced no consumer goods available today carries the value of the new automobile.

Certainly car dealers cannot be saddled with the blame for this practice. They are trying hard to deliver cars to people they believe will keep them. They are being prodded by factories to screen their order backlogs with this idea particularly in mind. Complaints which have been received concerning shady practices by dealers usually evaporate when the complainant is requested to repeat his story in the presence of the dealer and a factory representative.

On the score of loading cars with unwanted accessories, manufacturers say they install only what a specific order calls for, with the exception of heaters and radios, which are coming to be regarded as factory-installed standard equipment. Still many dealers will insist new cars come to them with the complete

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STRATOFREIGHTER: Brother to the B-29 Superfortress, the C-97 air freighter carrier lands at Fairfield-Suisun Army Air Base in California where it will join a fleet of the big liners to fly supplies to island bases in the Pacific. The C-97 is the latest type of super freighter sponsored by the Air Transport Command. NEA photo

"works" and they naturally resent removing accessories already installed. The remedy perhaps is for dealers to make a better effort to "sell" the customer on the value of accessories instead of just forcing him to take them.

Factory sales organizations generally are realizing the day is not too far off when some real selling by dealers will be necessary. By the most optimistic projections they figure this time is not over 18 months away.

Briggs Uses More Steel

Figures on steel consumption in automobile bodies and body parts, compiled by Briggs Mfg. Co., are of interest in depicting trends. In 1938, the company used 226,821 net tons of steel in bodies and parts, in 1939 the figure was 168,022 tons, in 1940 down slightly to 165,382 tons, in 1941 up to 268,857 tons, and in 1946 down again to 194,282 tons. Note the 1946 figure was well over both the 1939 and 1940 totals, although actually the plants were tooled to use 466,356 tons—obviously some overambitious tooling. The projection for the current year calls for 294,000 tons, well beyond any prewar figure. Close margin (according to Briggs) between steel deliveries to company plants and actual production in pounds of finished goods during 1946 is revealed by figures of 216,732 tons of steel received and the 194,282 tons of finished product, a margin of only 22,550 tons.

Prices To Continue High

On the subject of automobile prices, E. R. Breech, executive vice president of Ford, had some interesting comment to make in an address last week before the American Marketing Association. He concluded much of today's thinking on prices—both by business men and by the rest of the public—is based on nostalgia rather than on facts. They remember automobiles at $800, but forget that when cars could be bought at such a figure farm prices were 40 per cent of their present levels, wages averaged slightly more than half current rates, and the nation's goods and services were valued around $80 billion annually instead of the $180-odd billion of today.

Granting the likelihood of some price readjustments, he characterized as economic day-dreaming all talk of a serious reduction in prices of most manufactured goods when wage rates and other costs are rising. In the case of Ford, cost of materials purchased has risen 47 per cent since 1941, steel alone nearly one-third more. Average hourly rates, including additional increases arising from extra payments and benefits, are 60 per cent beyond 1941. Construction costs of new facilities, including four new assembly plants, reflected increases which by February of this year were nearly double the prewar level. Such increases push the 1941 break-even point in terms of production to far higher levels.

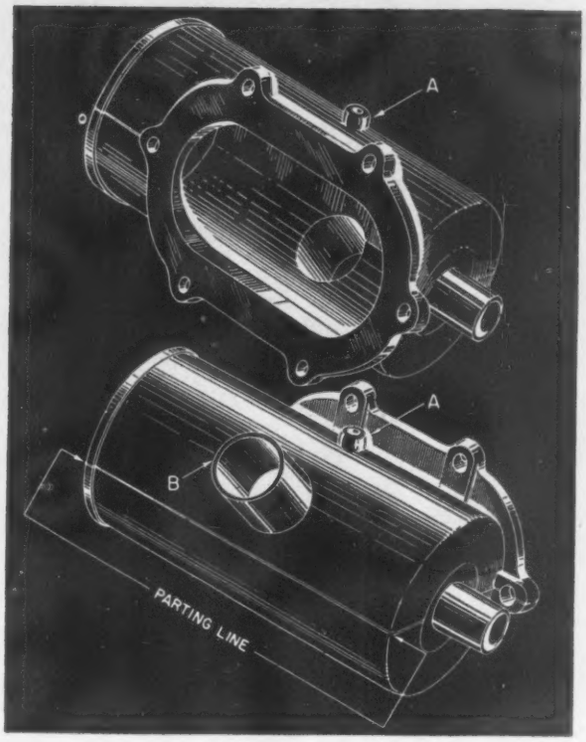
Breech added significantly that even businesses which are breaking even today, in the accounting sense, are in fact liquidating their plant assets since current costs do not provide sufficient funds to replace, at today's prices, the capital assets now being consumed. The manufacturers simply will have to rely on new capital funds for these replacements, to the extent that reduced dividends of improved efficiency in machines and management do not compensate.

Against this somber viewpoint, the Ford executive sketched a few brighter aspects. Some suppliers have held the line on prices since the Ford price reduction in January. A number of price reductions were received, and "hundreds" of price increases that were about to be made were canceled. The ironic part, however, is that such steps benefit Ford's competitors just as much as Ford. Concurrently a number of engineering improvements leading to cost reductions have been effected—a method for improving wheels saves 4 cents per wheel, or an annual saving of $95,000; a redesign in speedometers saves 81 cents per unit or $800,000 per year. Application of these techniques to the thousands of other parts used in cars and trucks should bring further important cost cuts.

Hydramatic for Buick, Pontiac

Possibility of additional General Motors models offering the hydramatic transmission on 1948 series is enhanced by reports both Pontiac and Buick foundries have ordered equipment to produce the special transmission housings required. Delivery schedules call for supply of the first production castings some time in December, so it is unlikely any of the new models will appear publicly before January, 1948. This would probably mean a short shutdown for model changeover around the Christmas holidays, much as was done last year.

It would appear doubtful Buick and Pontiac will offer the transmission on all their models at the start, possibly just on the larger series. Oldsmobile and Cadillac are currently supplying the device on 90 per cent or more of all production, and eventually this will be the case with Buick and Pontiac. However, the load it imposes on manufacturing facilities of the General Motors Transmission Division in Detroit would doubtless make it impractical to supply at the start all Buick and Pontiac models, since these two divisions likely will build something like 600,000 cars in 1948, against about 300,000 for Olds and Cadillac combined.



CORING ELIMINATES MACHINING

In designing die castings, remember that holes and recesses can easily be cored in the casting operation, thus eliminating the need for much machining. Where possible, such openings should be so located that they will be parallel to the die motion, in which case they can be formed by cores which are fixed to, or form integral parts of, the die.

In addition to savings in machining costs, cored holes provide the following advantages:

1. Holes and recesses are accurately sized and precisely located.
2. The quantity of metal required per casting is minimized.
3. Section thickness can be kept more uniform.
4. Overall cost is reduced.

When holes are required at angles *not* parallel to the motion of the die, movable cores are used to permit casting ejection. This may result in increased die cost and reduced casting rates, but the expense is frequently justified. A good case in point is the *zinc alloy* die casting shown above (a drain housing for an automatic washing machine).

Cores are pulled in four directions to form the various holes and recesses in this casting. The small bosses on either side (A) are cored by fixed projections in each half of the die, but the flange opening and screw holes at the top of the casting and the openings at either end require movable cores. In addition, the angle of the hose outlet at the bottom (B) necessitates the use of a slide (movable portion of the die). The added cost of this complicated coring is easily offset by the savings in metal and in machining costs. The coring has also reduced the section thickness of the side walls to approximately 1/16", although the flanges at the top and one end are "beefed up" to provide sections suitable for sanding to obtain gasket surfaces.

ALLOY SELECTION

Good die casting design is of no avail unless the proper alloy is selected. Furthermore, it is imperative that any alloy used in die casting production be carefully formulated with respect to every element involved to insure maximum mechanical properties and dimensional stability. If a zinc alloy is used, your die caster should provide one of those shown in the table below. These alloys are covered by specifications of the American Society For Testing Materials and the Society of Automotive Engineers.

Composition of Zinc Alloys For Die Castings

Composition* % by Weight	ZAMAK†-3 A.S.T.M.-XXIII S.A.E.-903	ZAMAK†-5 A.S.T.M.-XXV S.A.E.-925
Copper	.10 Max.	.75 to 1.25
Aluminum	3.5 to 4.3	3.5 to 4.3
Magnesium	.03 to .08	.03 to .08
Iron, Max.	.100	.100
Lead, Max.	.007	.007
Cadmium, Max.	.005	.005
Tin, Max.	.005	.005
Zinc	Remainder	Remainder

*Composition as provided in A.S.T.M. and S.A.E. Specifications. The Zamak alloys meet these specifications but are held within closer limits as to composition.
† A trade mark (registered in the U. S. Patent Office) identifying the zinc alloys developed by The New Jersey Zinc Company and used in the die casting industry.

For additional data on die casting design ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting."

Send for your copy ➡

ZINC FOR DIE CASTING ALLOYS

The New Jersey Zinc Company, 160 Front St., New York 7, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Allis-Chalmers To Expand Its Pittsburgh Plant

Enlarged plant is expected to raise productive capacity 50 per cent, says company president

AN expansion program expected to raise productive capacity 50 per cent has been announced for the Pittsburgh plant of Allis-Chalmers Mfg. Co., Milwaukee, by Walter Geist, president.

The first major expansion of the Pittsburgh property since Allis-Chalmers purchased it in 1927 will include a 250 x 400 ft building to be devoted largely to production of transformers, major item of manufacture at Pittsburgh. Another smaller building will be erected for storage.

Construction, to begin July 1, is expected to be completed on Nov. 1. The present employment of 1600 will be increased by about 30 per cent, Mr. Geist predicted.

WINS PENTON AWARD: G. Hazlett, left, chief engineer, Hy-Level Screw Products Co., Cleveland, accepts the Penton Publishing Co. award for "meritorious engineering in the field of producers equipment" at the annual Mid-America Exposition in Cleveland. The award was for the development of Hy-Level's liquid pressure bar feed attachment for single-spindle screw machines. Presenting the award are Albert E. Wilson, right, president of the Cleveland Technical Societies Council, and Frank G. Steinebach, vice president and secretary, Penton Publishing Co., which publishes STEEL and other business papers

Disco To Build Pittsburgh Coal Conversion Facility

A $3 million coal conversion plant and tar refinery will be built near Pittsburgh by Disco Co. Construction will start this month.

The company, subsidiary of Pittsburgh Consolidation Coal Co., said the plant will make a solid fuel called disco and will refine coal tar into a number of chemicals.

The new conversion plant will consume more than 1000 tons of high volatile coal and produce 800 tons of disco daily. The plant, together with the tar refinery, is scheduled for operation in October, 1948, according to Carl E. Lesher, president of Disco.

Pittsburgh Steel Acquires Johnson Steel & Wire Co.

Pittsburgh Steel Co., Pittsburgh, has acquired the Johnson Steel & Wire Co. Inc., Worcester, Mass., manufacturer of high carbon wire for the automobile, rubber tire, textile and musical instrument industries. The Johnson company has a main plant in Worcester, Mass., and branch plants and warehouses at Akron, O., and Los Angeles, Calif.

Joseph H. Carter, president of Pittsburgh Steel, said the move was "part of a carefully planned expansion of his company to extend operations in the finished products field." He pointed out that Pittsburgh Steel, which has an annual capacity of more than 1 million tons of steel and is currently operating at capacity, "has very little semifinished steel to sell outside of our own requirements."

Johnson Steel & Wire Co. Inc. will continue business under its own name as a wholly owned subsidiary of Pittsburgh Steel Co., with Charles David Johnson as president.

Three Metalworking Plants Put Up for Sale by WAA

Three metalworking plants are being offered for sale this month by War Assets Administration, Chicago.

These include an aircraft project at South Bend, Ind., operated during the war by Studebaker Corp. The 318-acre tract of land on which the facility is situated originally cost the government $14,590,704. Property will be sold June 24.

Also to be sold will be a Defense Plant Corp. factory in Chicago, built at a cost of $11,575,185 and operated by Revere Copper & Brass Co. as a brass casting furnace and rolling mill. The date of sale will be June 30.

The Milwaukee Ordnance plant, Milwaukee, will also go on the block. Land cost alone for this property was $2,577,000. June 27 has been set as the date of sale.

Oliver Corp. Postpones Plan To Move Offices

Oliver Corp. has postponed indefinitely its recently announced plans for moving its general and engineering offices from Chicago to South Bend, Ind.

Alva W. Phelps, company president, states that material scarcities and rocketing costs which have cut new housing 25 per cent under spring goals, virtually halted apartment construction in large population centers and impeded industrial epansion everywhere, are the principal factors preventing the move at this time.

Mr. Phelps continued: "Tremendous increases in manufacturing costs during the last few years, and the necessity of heavy investments for modernization of productive facilities to meet the vigorous competition already evident in American business combine to force management to watch carefully the expenditure of every dollar.

"We are not, therefore, justified in making the move discussed and approved last year, no matter how desirable it may seem to be, during this period of maximum costs."

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

American President Lines, Los Angeles, has announced that the Maritime Commission has authorized bids for building five passenger vessels. Bids will be opened Aug. 13. Each ship will have overall length of 536 feet, beam of 73 feet, cruising speed of 19 knots and accommodations for 189 persons.

—o—

Aro Equipment Corp., Bryan, O., manufacturer of lubricating equipment and air tools, has opened a technical school in Bryan for training sales and service personnel. Classes are one week in length, and the program includes lectures, laboratory work and practical training.

—o—

War Assets Administration has entered into an interim leasing arrangement with Dow Chemical Co., Midland, Mich., whereby Dow is allowed to use magnesium extrusion equipment owned by the government but located in Dow's Midland plant. Consisting of large presses which originally cost the government over $1,650,000, the equipment will be used in experimental processes.

—o—

Harmon & Co., Chicago, manufacturers' distributor and consulting engineering firm, has moved to 208 Palmolive Bldg. Harmon represents Gas Machinery Co., Cleveland, manufacturer of industrial furnaces.

—o—

Automatic Sprinkler Co. of America, Youngstown, has organized an affiliate, Automatic Sprinklers do Brasil S/A, Sao Paulo, Brazil. Plans for a factory for the manufacture of fire protection equipment are nearing completion.

—o—

Eaton Mfg. Co., Cleveland, manufacturer of axles, springs, spring washers, has purchased from WAA for $801,659 the remainder of the war-surplus plant it has been operating at Detroit. One year ago Eaton bought the other part of the facility for $100,308.

—o—

McCray Refrigerator Co., Kendallville, Ind., has introduced a water cooler to its line of commercial refrigeration products.

—o—

Michigan Tool Co., Detroit, has appointed Vittetow Inc., Denver, as representative for its line of gear production equipment in Colorado, Utah and Wyoming.

—o—

Mid-West Abrasive Co., Detroit, maker of grinding wheels and coated abrasives, has revealed that Germany is 15 to 20 years behind the United States in techniques of manufacturing abrasives. This is the opinion of J. T. Jackson, president, and L. P. Jackson, vice president of Mid-West, who recently returned from a tour of abrasive plants in the British and American occupation zones of Germany.

—o—

Cleveland Graphite Bronze Co., Cleveland, manufacturer of bearings, bushings and other industrial products, will be closed June 28 to July 14 for vacations.

—o—

General Electric Co., Schenectady, N. Y., recently presented its annual Charles A. Coffin award to New York State Electric & Gas Corp. "for outstanding public service and benefit to American industry." The award comprises a gold metal and $1000 presented to the recipient's employees' benefit or similar fund.

—o—

United States Rubber Co., New York, has announced the return to production of its puncture-sealing inner tube, which contains plastic rubber inside the crown to surround puncturing objects.

—o—

Ladish Co., Cudahy, Wis., manufacturer of forgings, has purchased from WAA for $2,200,000 a surplus steel forging plant at Cudahy. Formerly leased by Ladish, the project originally cost the government $10,461,877 and occupies about 15 acres.

—o—

Pacific Steel Foundry Co., Portland, Oreg., producer of carbon and alloy electric steel castings, has signed a five-year lease with WAA for a plant it now occupies at 1979 N. W. Vaughn St.

—o—

Orilla Body & Machine Works, Seattle, has leased a portion of the former Boeing plant at Renton, Wash., from WAA. Firm plans to increase production to 100 truck bodies monthly.

—o—

New Holland Metals Co., Leola, Pa., has been formed as a subsidiary of New Holland Machine Co., manufacturer of farm and industrial equipment. Subsidiary will fabricate roofing, siding and other aluminum building materials.

—o—

Cities Service Refining Co., Bartlesville, Okla., has purchased from WAA for $121,100 a partially-improved, 162-acre tract five miles south of Lake Charles, La. The tract was acquired by the government as a site for a toluene plant, a project abandoned on V-J Day.

—o—

Thompson Products Inc., Cleveland, manufacturer of bolts, valves and other products, has purchased about $200,000 worth of machinery, tools, equipment and inventory from International Piston Ring Co., Cleveland.

—o—

Gem Foundry Co., Birmingham, has acquired the former plant of Dixie Bronze Co., Sixth Ave. and 13th St. Gem will manufacture light and medium gray iron castings.

—o—

Ceco Steel Products Corp., Chicago, manufacturer of metal building materials, has opened a New York district plant and office at Hillside, N. J. This is the firm's fourteenth plant.

—o—

Reed Engineering Co., formerly of Webb City, Mo., manufacturer of plate bending rolls, power turning rolls, welded steel products and special machinery, has begun production in its new plant at Carthage, Mo.

—o—

Joseph T. Ryerson & Son Inc., Chicago, has opened a sales office in Syracuse, N. Y., at 208 Larned Bldg. Albert E. Fitzell Jr. is in charge.

—o—

Pratt & Whitney Aircraft Division, East Hartford, Conn., United Aircraft Corp., has announced a new 1650 hp, air-cooled engine, designed for use in two-engined transports carrying about 30 passengers at speeds up to 250 miles an hour.

—o—

Glenn L. Martin Co., Baltimore, will receive a $16 million loan from Reconstruction Finance Corp. The loan will be for working capital in production of the Martin 202, a commercial transport type plane for intermediate distance service.

—o—

War Assets Administration is offering for sale or lease an electric steel foundry at Renton, Wash. Completely equipped and ready for immediate production, the facility contains 140,000 sq ft of floor area. Its rated capacity is about 1200 tons of castings per month.

—o—

Foster Wheeler Corp., New York, manufacturer of power plant and oil refinery equipment, predicts that its operations will expand in the second half of this year as a result of an increased flow of materials, notably steel.

—o—

Manhattan Rubber Division, Passaic, N. J., Raybestos-Manhattan Inc., recently honored 59 employees who had completed 25 years' service.

The Business Trend

Increased Tempo Noted In Industrial Activity

INDUSTRIAL PRODUCTION in the week ended June 7 returned to the level prevailing in the week prior to the Memorial Day holiday week. This performance put STEEL's industrial production index up to 160 per cent of the 1936-1939 average, compared with 150 in the holiday week.

Among factors showing gains is steel ingot output which again is up approximately to the postwar high mark. The view is held that continued high steel production will bring about a supply-demand balance by the year-end in most steel products except flat-rolled.

AUTOS—Production of an estimated 98,643 automobiles in the week ended June 7 was the highest assembly rate since the week ended May 3. In the week ended May 31, output was down to 79,315 passenger cars, trucks and busses. May production totaled 389,829 units. For June, the anticipated total is 445,000.

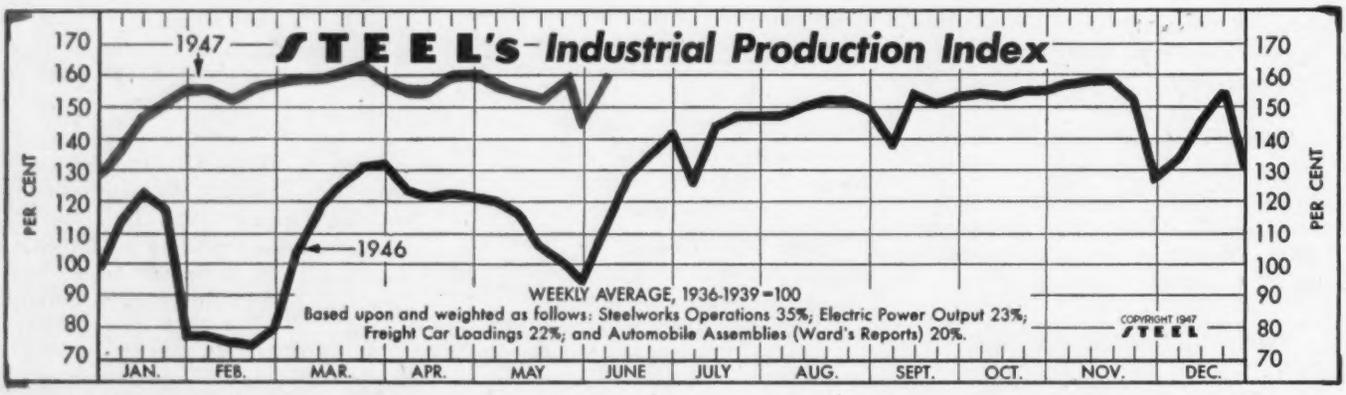
COAL—The Memorial Day holiday cut bituminous coal production to an estimated 12,050,000 net tons, compared with 12,820,000 in the preceding week. Output in the week ended June 14 is expected to be affected to some extent at least by stoppage of work by some soft coal miners protesting pending labor legislation.

PRICES—Rises in most commodity groups put the U. S. Bureau of Labor Statistics wholesale price index for the week ended May 31 to 147.4 per cent of the 1926 average, highest level since mid-April. However, the index is 1.3 per cent lower than the high point reached at the end of March.

RAILROADS—Estimated net income of class 1 railroads in April was the second highest of the year. It amounted to $32,600,000 after interest and rentals, according to the Association of American Railroads. High month was March, when estimated net income after interest and rentals totaled $43,600,000. In the first four months of 1947 the rails had an estimated net income after interest and rentals of $121 million, compared with a $100,000 deficit in the corresponding period of 1946 which was affected adversely by a coal strike.

NEW BUSINESSES—New businesses are being formed in smaller numbers now than at this time a year ago, figures from Dun & Bradstreet Inc. revealing new business incorporations in April totaled 9802 compared with 10,247 in March and that for the first four months of 1947 they aggregated 41,272 compared with 48,254 in the corresponding period of 1946. Each month during 1947 new stock company formations have been fewer than in the corresponding month of 1946.

CASTINGS—Shipments of malleable iron castings during April totaled 81,890 tons, largest since March, 1945, and more than double the average monthly shipments for 1935-1939, inclusive. With an accelerated rate of shipments and a decline in new orders booked, the backlog of orders receded from 280,724 tons at the end of March to 275,415 at the end of April.



The Index (see chart above): Latest Week (preliminary) 160 Previous Week 150 Month Ago 156 Year Ago 112

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.5	95.5	92.0	55.0
Electric Power Distributed (million kilowatt hours)	4,635	4,429	4,653	3,920
Bituminous Coal Production (daily av.—1000 tons)	2,008	2,137	2,095	598
Petroleum Production (daily av.—1000 bbl.)	5,064	5,024	5,005	4,896
Construction Volume (ENR—Unit $1,000,000)	$121.1	$72.2	$95.2	$182.2
Automobile and Truck Output (Ward's—number units)	98,643	79,315	94,756	43,175

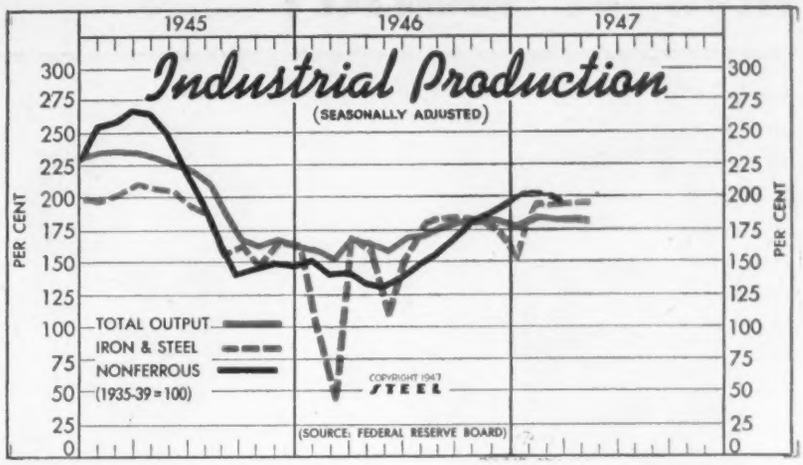
* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

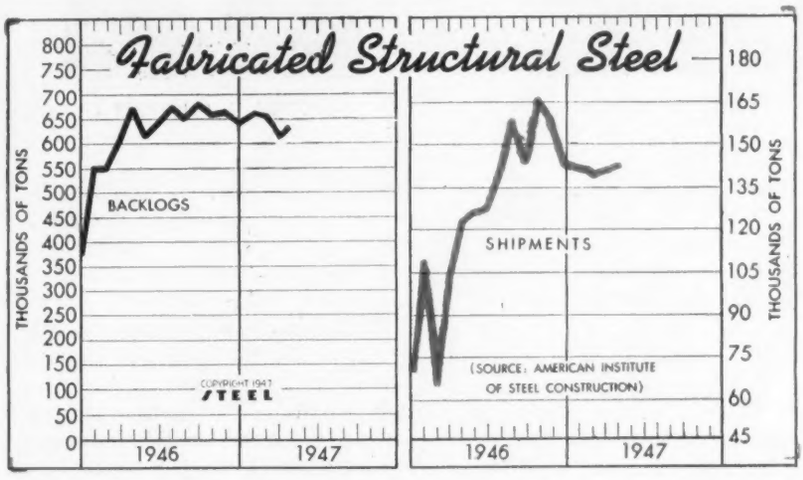
TRADE				
Freight Carloadings (unit—1000 cars)	890†	830	884	830
Business Failures (Dun & Bradstreet, number)	66	72	98	13
Money in Circulation (in millions of dollars)‡	$28,261	$28,211	$28,197	$28,159
Department Store Sales (change from like wk. a yr. ago)‡	+12%	+13%	+12%	+32%

† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes
(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1947	1946	1947	1946	1947	1946
Jan.	188	160	192	102	203	150
Feb.	189	152	191	43	203	141
Mar.	190	168	196	169	196	139
Apr.	187	165	196	159	...	132
May	...	159	...	109	...	128
June	...	170	...	154	...	137
July	...	172	...	180	...	151
Aug.	...	177	...	184	...	159
Sept.	...	179	...	185	...	172
Oct.	...	181	...	184	...	184
Nov.	...	183	...	178	...	192
Dec.	...	182	...	159	...	197
Ave.	...	171	...	150	...	157



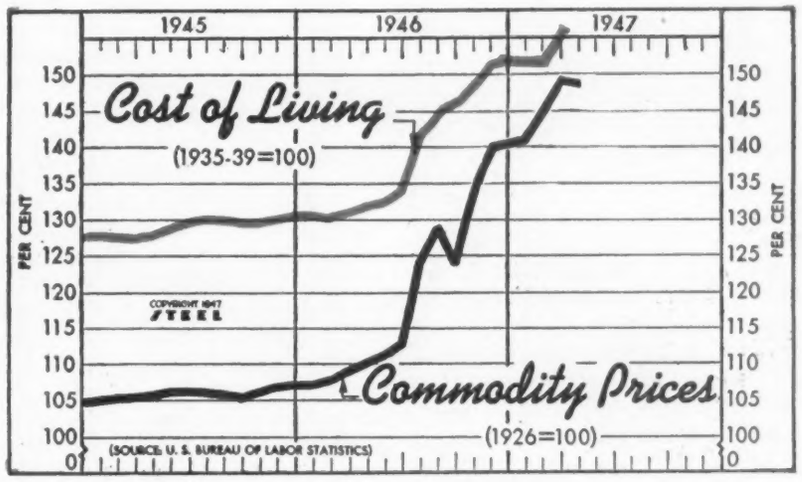


Fabricated Structural Steel
(000 Tons)

	Shipments			Backlogs		
	1947	1946	1945	1947	1946	1945
Jan.	140.6	107.5	57.0	661	552	124
Feb.	136.1	63.8	49.0	656	551	152
Mar.	137.8	102.8	59.5	614	605	153
Apr.	139.0	122.5	62.8	632	674	163
May	....	124.4	72.6	...	615	166
June	....	126.8	69.2	...	642	195
July	....	140.2	69.9	...	674	194
Aug.	....	157.5	70.6	...	651	201
Sept.	....	141.9	63.4	...	682	248
Oct.	....	164.7	76.6	...	660	283
Nov.	....	157.3	78.0	...	665	305
Dec.	....	142.1	68.8	...	646	375
Total	....	1,551.6	797.4	...	...	...

Wholesale Commodity Price—Cost of Living Indexes

	Commodities (1926=100)			Living Cost (1935-39=100)		
	1947	1946	1945	1947	1946	1945
Jan.	141.5	107.1	104.9	153.3	129.9	127.1
Feb.	144.5	107.7	105.2	153.2	129.6	126.9
Mar.	149.5	108.9	105.3	156.3	130.2	126.8
Apr.	147.7	110.2	105.7	....	131.1	127.1
May	....	111.0	106.0	....	131.7	128.1
June	....	112.9	106.1	....	133.3	129.0
July	....	124.7	105.9	....	141.2	129.4
Aug.	....	129.1	105.7	....	144.1	129.3
Sept.	....	124.0	105.2	....	145.9	128.9
Oct.	....	134.1	105.9	....	148.6	128.9
Nov.	....	139.7	106.8	....	152.2	129.3
Dec.	....	140.9	107.1	....	153.3	129.9
Ave.	....	120.9	105.8	....	139.3	128.4



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,319	$11,629	$12,865	$10,769
Federal Gross Debt (billions)	$257.5	$258.3	$257.7	$271.4
Bond Volume, NYSE (millions)	$13.8	$13.4	$16.3	$19.1
Stocks Sales, NYSE (thousands)	3,209	2,998	3,703	5,582
Loans and Investments (billions)†	$54.9	$54.8	$55.3	$63.9
United States Gov't. Obligations Held (millions)†	$34,479	$34,535	$34,745	$45,593

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.82	$69.82	$69.82	$63.54
All Commodities†	147.4	146.9	146.7	111.1
Industrial Raw Materials†	161.1	160.3	159.4	125.1
Manufactured Products†	142.5	142.1	142.2	106.5

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

WILSON H. MORIARTY

HENRY W. KAYSER

JOHN H. BANINGER

Wilson H. Moriarty, vice president, National Malleable & Steel Castings Co., Cleveland, has been elected president of the Malleable Founders Society for the coming year. He succeeds **Frank Shumann,** president of Lehigh Foundries Inc., Easton, Pa. **Collins Carter,** president of Albion Malleable Iron Co., Albion, Mich., has been elected vice president of the society, and the following directors have been elected for three year terms: **Mr. Carter, C. A. Gutenkunst Jr.,** president, Milwaukee Malleable & Grey Iron Works; **J. H. Smith,** general manager of Central Foundry Division, General Motors Corp., at Saginaw, Mich.; and **F. D. Brisse,** president, Laconia Malleable Iron Co., Laconia, N. H.

—o—

New vice presidents elected by the Nordberg Mfg. Co., Milwaukee, are as follows: **R. W. Bayerlein,** in charge of Heavy Machinery Division; **D. A. Cheyette,** in charge of the Crusher & Screen Division; **R. R. Shafter,** in charge of the Processing Machinery Division; and **H. H. Talboys,** in charge of Railway Equipment Division.

—o—

Paul W. Eberhardt has been elected a director of Walter Kidde & Co. Inc., New York. He has been with the company 21 years, and since 1945 has been vice president.

—o—

Charles G. Pyle has resigned as president and chairman of the board of Arrow Safety Device Co., Mt. Holly, N. J. **C. S. Vanderblue** has been named executive vice president in charge of operations.

—o—

Richard T. Speer has been appointed regional sales manager for All-State Welding Alloys Co., White Plains, N. Y. He will represent the company's line of low-temperature welding and brazing alloys and fluxes. His territory includes eastern Pennsylvania, southern New Jersey, Virginia, West Virginia, Delaware, Maryland, and the District of Columbia.

—o—

Henry W. Kayser has been appointed supervisor of development engineering at the Falk Corp., Milwaukee. In connection with his enlarged duties, Mr. Kayser will be available for field consultation, when the occasion demands. Since 1931 he has been associated with the corporation as designer, application engineer, and development engineer.

—o—

William A. Roberts and **William C. Johnson** have been appointed executive vice presidents, respectively, of the Tractor and General Machinery Divisions of the Allis-Chalmers Mfg. Co., Milwaukee. **Marshall L. Noel** has been appointed vice president and general sales manager for the Tractor Division, and **J. L. Singleton,** vice president and director of sales for the General Machinery Division.

—o—

Randolph J. Roshirt has been appointed general manufacturing manager of the Bohn Aluminum & Brass Corp., Detroit. He will have charge of all manufacturing in the corporation's 14 plants. Since 1935 Mr. Roshirt has been in direct charge of all foundry production for the corporation.

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Admiral Ben Moreell, president and board chairman, Jones & Laughlin Steel Corp., Pittsburgh, has been elected to the board of trustees of Industrial Hygiene Foundation, a research organization for the advancement of health in industry.

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Lester B. Hammersley, Signode Steel Strapping Co., Chicago, has been promoted to assistant sales manager of the company. He joined the organization in 1945 in a market research capacity.

—o—

John H. Baninger has been reappointed assistant chief engineer, New Departure Division, General Motors Corp., at Bristol, Conn. He has been associated with New Departure Division for 21 years, and previously had served for 12 years as chief engineer of the Marlin-Rockwell Corp., Jamestown, N. Y. The division also has named **Frederick J. Garbarino,** manager of bearing applications, **Leland D. Cobb,** manager of research and development, **S. Robert Large** has been named bearing products engineer, and **Salvatore F. Marino** has been appointed bicycle products engineer.

—o—

John A. Worthington has been appointed general sales manager of the Piston Ring Division, Koppers Co. Inc., Pittsburgh. He has been manager of industrial sales and engineering in the American Hammered Piston Ring Division. **T. Latimer Ford** has been named to head up a new company department devoted exclusively to replacement sales. He has been associated with Koppers or its affiliates since 1908.

—o—

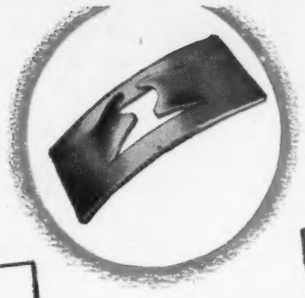
O. W. Tupper has retired as an assistant to the president of Boeing Airplane Co. and its subsidiary, Boeing Aircraft Co., Seattle. He has been succeeded by **Norman Allen.**

—o—

Frank C. Hackett has been named sales promotion manager, Bell & Gossett Co., Morton Grove, Ill. W. Porter Gossett is manager of the Industrial Division of the company.

—o—

Arthur Dressel has been elected senior

THIS  IS A SPEED NUT

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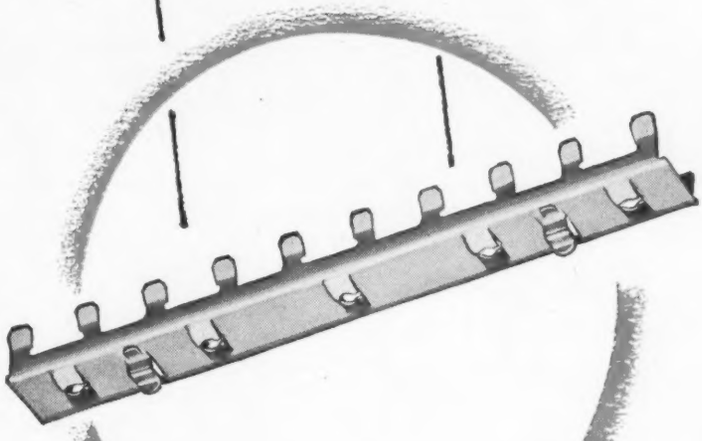
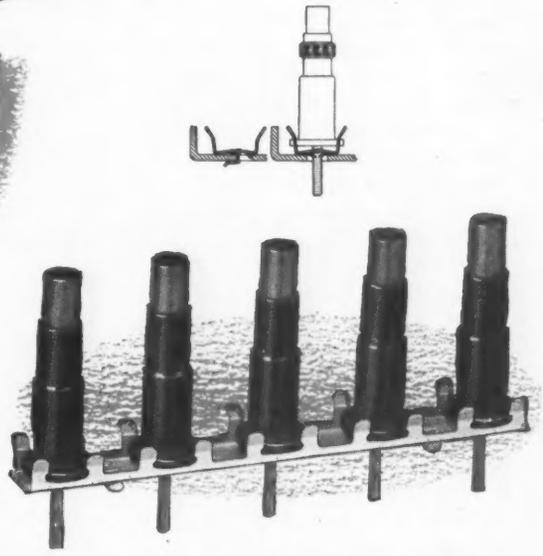




THIS *is also a* SPEED NUT

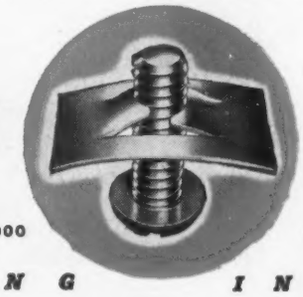
It looks more like a caterpillar than a nut, doesn't it? But a nut it is . . . or rather, five SPEED NUTS combined into one, to simplify and improve the assembly of multiple coil forms on radios.

This one ingenious fastener replaced eight separate parts formerly used and eliminated expensive drilling and tapping operations. It retains the tuning cores and screws, provides exactly the right tension on the screws, and its spring arms hold the plastic coil tubes securely in place.

This is just one example of hundreds where the basic SPEED NUT principle is applied to develop a special fastener for better, more economical assembly. SPEED NUT brand fasteners may be the answer to your quest for lower assembly costs, so be sure to investigate these streamlined fastening devices. Write us today, including engineering details, and we'll give you a complete, no-charge analysis.

TINNERMAN PRODUCTS, INC.,
2039 FULTON ROAD • CLEVELAND, OHIO

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S. A., Paris
In Australia: Aerocessories, Pty. Ltd., Melbourne

Speed  *Nuts** PATENTED

*Trade Mark Reg. U. S. Pat. Off.

MORE THAN 4000 SHAPES AND SIZES

F A S T E S T T H I N G I N F A S T E N I N G S

vice president of R. Hoe & Co. Inc., New York. He will continue as general sales manager.

—o—

Howard O. Lund has been named sales manager for Willys-Overland Motors Inc., Toledo, O. He has been assistant sales manager in charge of the western territory.

—o—

Alfred Iddles, vice president and director of the Babcock & Wilcox Co., New York, is one of two official delegates representing the American Society of Mechanical Engineers at the centenary celebration of the British society, the Institution of Mechanical Engineers, which opened in London, Eng., June 8. He is a fellow and past president of the ASME. The other delegate is **Dr. A. G. Christie,** professor of mechanical engineering, Johns Hopkins University.

—o—

District vice presidents elected to the executive committee of the National Association of Purchasing Agents are as follows: **C. C. Pingree,** Whitmore Oxygen Co., Salt Lake City, Utah; **C. S. Worley,** Consolidated Gas Utilities Corp., Oklahoma City, Okla.; **Paul O'Brien,** Frank Adam Electric Co., St. Louis, Mo.; **A. N. Phillips,** Schwitzer-Cummins Co., Indianapolis; **G. A. Ireland,** National Paper Goods Ltd., Hamilton, Ont.; **L. A. Anderson,** Twin Coach Co., Kent, O.; **W. E. Rier,** Rotary Lift Co., Memphis, Tenn.; **H. W MacIntosh,** L. O. Koven & Bro. Inc., Jersey City, N. J.; **J. C. Andrews,** American Hardware Corp., New Britain, Conn.

—o—

Carl R. Hellstrom, president of Smith & Wesson Inc., Springfield, Mass., has been presented the Certificate of Appreciation by the War Department for loyal and outstanding assistance to the Ordnance Department during World War II in connection with the production of small arms and for inventive ability displayed in the development of mechanical improvements of small arms.

—o—

Rivers O'Brien, manager of the New York crude rubber office, Goodyear Tire & Rubber Co., Akron, has completed 25 years' continuous service with the company. He was presented with a diamond-studded service pin and the company's cash award.

—o—

Patrick J. Shea has become associated with the W. B. Connor Engineering Corp., New York.

—o—

Terry P. Cunningham has been appointed advertising manager of the Radio Tube, Electronics and International Divisions of Sylvania Electric Products Inc., New York. He has been sales manager, Home Radio Division, Colonial Radio Corp., a Sylvania subsidiary.

—o—

George W. Sweeny has been elected vice president of United States Coal & Coke Co., subsidiary of U. S. Steel Corp., New York. He will continue his present position as vice president, H. C. Frick Coke Co. and as auditor of United States Coal & Coke and associated Frick companies, U. S. Steel subsidiaries.

—o—

John F. McMullen has been appointed superintendent of the car department, Erie Railroad Co., Cleveland.

—o—

L. A. Johnson, president of National Motor Bearing Co. Inc., Redwood City, Calif., has been elected president of the California Manufacturers Association. **M. B. Pendleton,** Plomb Tool Co., Los Angeles, has been elected first vice president, and **Edgar B. Jessup,** Marchant Calculating Machine Co., Oakland, second vice president.

—o—

Henry L. Woods Jr. has been advanced to the position of assistant to the executive vice president, Sales Division, American Rolling Mill Co., Middletown, O. He has been manager of central sales. **Wallace B. Quail** has been named manager of central sales to succeed Mr. Woods, and **Robert Y. Barham** has been promoted to district manager of New York-Boston district.

—o—

Val Lee has been elected president of the Sidney Machine Tool Co., Sidney, O., to fill the vacancy caused by the death of **F. P. Thedieck.** He will continue as treasurer of the company, which position he has held for the past 18 years.

—o—

A. J. Kindig has become associated with Webster Mfg. Co., Tiffin, O., and has been appointed plant engineer. He was formerly with Dodge Mfg. Corp., Mishawaka, Ind., and more recently served as general superintendent of T. B. Woods Sons' Co., Chambersburg, Pa.

—o—

H. D. Foster has been named manager, Mechanical Goods Division, Goodyear Tire & Rubber Co., Akron, to succeed the late **W. C. Winings.** He has been manager of the Cleveland district office of that division. **Sam DuPree,** sales manager of the company's molded goods plant in St. Marys, O., has been named assistant manager of the Mechanical Goods Division.

—o—

Arthur M. Long, assistant general manager of sales and manager of tin plate sales, Youngstown Sheet & Tube Co., Youngstown, has been transferred from Youngstown to Chicago. **Myron H. Watkins,** assistant manager of tin plate sales, has been transferred from Chicago to Youngstown, and becomes assistant general manager of sales.

—o—

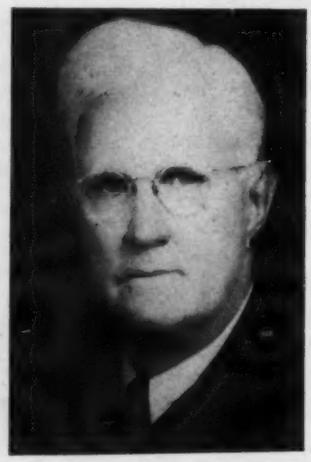
T. Clayton Cheney has been appointed advertising manager of the new container program of the Inland Steel Container Co., Chicago. The new container program will be launched under his direction. In addition to this assignment, Mr. Cheney will continue his present position as manager of advertising and sales promotion of the company's subsidiary, the Milcor Steel Co., Milwaukee.

—o—

Milton F. Lepper, formerly connected with the purchasing department of Jones & Laughlin Steel Corp., Pittsburgh, has become associated with the Max Solomon Co., Pittsburgh.

—o—

Paul R. Croll has been appointed assistant to the vice president in charge of the Paint Division, Pittsburgh Plate Glass Co., Pittsburgh. **Dr. William H. Lycan** has been named executive director of

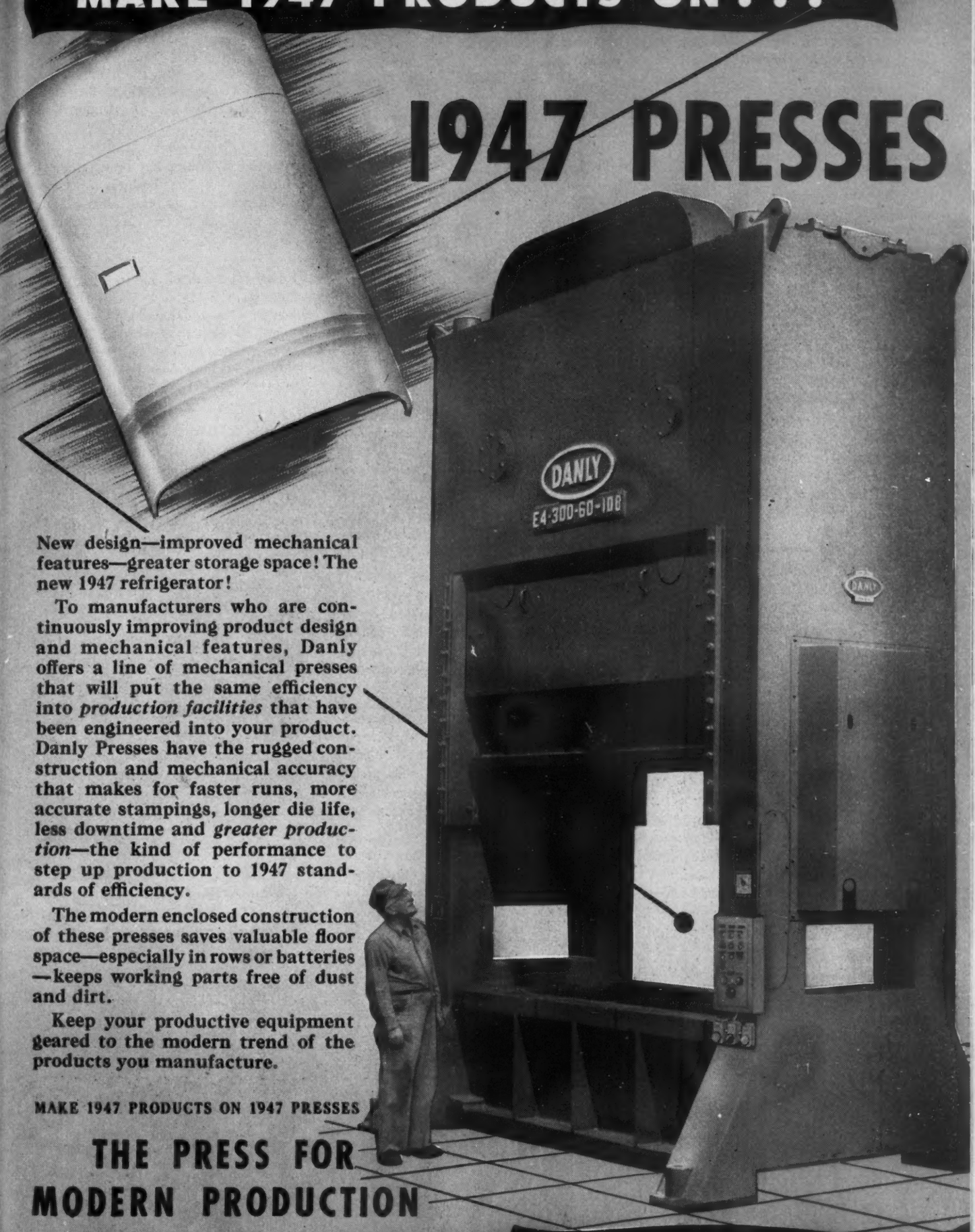


VAL LEE

MILTON F. LEPPER

MAKE 1947 PRODUCTS ON . . .

1947 PRESSES



New design—improved mechanical features—greater storage space! The new 1947 refrigerator!

To manufacturers who are continuously improving product design and mechanical features, Danly offers a line of mechanical presses that will put the same efficiency into *production facilities* that have been engineered into your product. Danly Presses have the rugged construction and mechanical accuracy that makes for faster runs, more accurate stampings, longer die life, less downtime and *greater production*—the kind of performance to step up production to 1947 standards of efficiency.

The modern enclosed construction of these presses saves valuable floor space—especially in rows or batteries—keeps working parts free of dust and dirt.

Keep your productive equipment geared to the modern trend of the products you manufacture.

MAKE 1947 PRODUCTS ON 1947 PRESSES

THE PRESS FOR MODERN PRODUCTION

This 300-ton 4-point press is typical of the Danly line of one, two and four point models which range in size from 100 tons up—special sizes and adaptations built to customer specifications.

DANLY

MACHINE SPECIALTIES, INC.

2100 S. 52nd Avenue • Chicago 50, Illinois

research for the division, with offices at Pittsburgh, and is succeeded as director of research for the division at Milwaukee by **Dr. Howard L. Gerhart.**

—o—

Alfred H. Zimmerman has been appointed assistant manager of Universal Atlas Cement Co., Independence, Kan., subsidiary of U. S. Steel Corp., New York.

—o—

Edwin C. Barringer, executive secretary of the Institute of Scrap Iron & Steel Inc., Washington, has been appointed to the National Resources Department of the U. S. Chamber of Commerce.

—o—

G. L. Pike has been appointed sales representative for Gibson Electric Co., Pittsburgh. He will cover the New England States.

—o—

Eugene L. Craig has been named sales manager for the International B. F. Goodrich Co. in the territory of Hawaii. He will have charge of the sales of all the company's products in the Hawaiian Islands.

—o—

Donald N. Watkins, president and general manager, Laclede-Christy Clay Products Co., St. Louis, has been elected a director of the American Refractories Institute. He succeeds William P. Hemphill.

—o—

William S. Thiess has been appointed field service representative by the Optimus Detergents Co., Matawan, N. J. He will cover the Philadelphia and Baltimore areas.

—o—

The Carpenter Steel Co., Reading, Pa., has announced the following promotions: **O. V. Greene,** formerly manager of tool and alloy steel sales, has been appointed assistant general sales manager. **H. S. Potter,** formerly assistant manager of tool steel sales, has been promoted to manager of tool steel sales. **W. M. Loos,** assistant manager of stainless steel sales, has been named manager of stainless steel sales. **J. W. Thompson,** assistant manager of alloy steel sales, has been named manager of alloy steel sales. **J. D. Nelson,** formerly sales engineer in the Chicago territory, has been named assistant manager of tool steel sales, and **M. H. Goodman,** previously sales engineer in the New England territory, has been appointed assistant manager of stainless steel sales. **E. Von Hamback,** research and development engineer, Detroit, has been transferred to the Reading headquarters.

—o—

Warren Master, formerly connected with the Federal Telephone & Radio Corp., East Newark, N. J., has joined the engineering staff of the Richardson-Allen Corp., New York, as rectifier engineer.

—o—

Raymond R. Wiese, previously assistant to the manager, Kaiser Fleetwings Inc., Bristol, Pa., has been elected secretary-treasurer, Drafting Associates, Bristol, Pa.

—o—

Miss Donna M. Hammond has been elected assistant secretary, Link Aviation Inc., Binghamton, N. Y., and **Gilbert L. Rolles,** assistant treasurer of the company.

—o—

Zolly C. Van Schwartz, recently chief machinery engineer, design, development and research with Peck Stow & Wilcox Co., Southington, Conn., has been put in charge of the standards department of General Machinery Corp., Hamilton, O.

—o—

Harry T. Burke, chief engineer of the Brooklyn, N. Y., plant of the E. W. Bliss Co., Detroit, has been appointed assistant to the general sales manager, with headquarters in Detroit.

—o—

R. E. Stewart has been appointed manager of the new Sales Research & Planning Division of Underwood Corp., New York.

—o—

Malcolm R. Fuller has been appointed manager of the business management department of the northeastern region of Ford Motor Co., Dearborn, Mich.

—o—

Edward F. Cahoon has rejoined Tel-Autograph Corp., New York, as chief engineer. He will handle all engineering and developing activities. For the past five years he has been engaged in highly secret work done by W. L. Maxson & Co., New York, for the Navy.

—o—

Charles A. Burton has been appointed assistant general sales manager of the Lighting Division, Sylvania Electric Products Inc., New York. **George W. Field** has been named to head the Central Division of the company's sales forces, and **Ralph E. Niedringhaus** to head the East Central Division.

—o—

Fred A. Hacker has been appointed vice president in charge of sales research, American Type Founders Inc., Elizabeth, N. J. He formerly had been manager of product research and development.

—o—

Roland C. Disney, formerly manager of eastern district sales of the Baldwin Locomotive Works, Philadelphia, has been promoted to the position of assistant general sales manager. He is succeeded in the eastern district by **Edwin R. Wisner.**

—o—

George J. Easter, formerly connected

S. A. FULLER

Appointed manager, market research department, Jones & Laughlin Steel Corp., Pittsburgh. Noted in STEEL, June 9 issue, p. 68

ALBERT C. BEESON

Named director of industrial relations, Food Machinery Corp., San Jose, Calif. Noted in STEEL, June 9 issue, p. 68

TONY REITBERGER

Appointed assistant chief engineer, Warren City Mfg. Co., Warren, O. Noted in STEEL June 9 issue, p. 70

with the Carborundum Co., Niagara Falls, N. Y., has joined the Electro Refractories & Alloys Corp., Buffalo, as director of research. He succeeds **Milton H. Berns** who, last January, had been appointed director of technical service for the corporation.

—o—

K. L. Konnerth has been appointed general manager of operations, H. C. Frick Coke Co. and United States Coal & Coke Co., U. S. Steel Corp. subsidiaries. He is succeeded as assistant to president in charge of engineering of the companies by **A. J. Breitenstein.**

—o—

M. J. Vollmer, assistant secretary and assistant treasurer, A. O. Smith Corp., Milwaukee, has been elected a director of the company to succeed **John Leekley,** resigned.

—o—

John W. Greve, managing editor, *Machine Design,* published by the Penton Publishing Co., Cleveland, has been elected president of the Cleveland Engineering Society. Other officers named by the society are: **T. J. Sokol,** vice president; **P. D. Scott,** treasurer; and **George C. Hantelman,** re-elected secretary-manager for the seventh year.

—o—

John DeHetre has been appointed development engineer on the operating staff of the Youngstown Sheet & Tube Co., Youngstown. He formerly was field engineer for Youngstown Steel Products, a subsidiary company in California. During the war he was on leave of absence two years to serve as assistant chief engineer for Hillman-Kelley Co., Los Angeles, which was making aircraft assemblies and gun mounts for tanks.

—o—

James M. Darbaker, manager of operations, Chicago district, Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp., New York, has opened an office in Pittsburgh, and in the future will make it his principal headquarters. The move is in the interest of providing closer co-operation of policies affecting operations of all corporation plants and, although Mr. Darbaker will divide his time between the two cities, he will be able to report directly to Carnegie-Illinois executives on matters concerning Chicago area plants.

—o—

Robert G. Calton, executive vice president, Tennessee Enamel Mfg. Co., Nashville, Tenn., for the past 18 years, has joined the sales staff of Chicago Vitreous Enamel Product Co., Cicero, Ill., to work with enameling plants in the southern territory. **Wesley L. Dinsmore** joined the Chicago Vitreous Enamel Product Co. as service engineer, and **Wm. L. Donaldson** has joined the same company.

—o—

James O. Peck has been named vice president in charge of sales, Putnam Publishing Co., New York and Chicago. In 1944 he organized the James O. Peck Co., New York, and now becomes advisory head of that company which continues its own activities under the direction of **Ira Cotins,** associated with the firm since its organization. Mr. Peck returns to Putnam Publishing, with whom he had formerly been associated from 1922 to 1928.

OBITUARIES . . .

Edwin R. Motch, 72, chairman of the board of the Motch & Merryweather Machinery Co., Cleveland, died June 7 of a heart attack. He had been associated with the company since it was organized in 1904 by his brother, the late Stanley Motch, the late George Merryweather, and himself. In 1930 he became president, succeeding Mr. Merryweather. Last year he became chairman of the board and his son, Edwin Motch Jr., succeeded him as president.

—o—

Chester A. Kellogg, 55, chief of metallurgy and inspection, Continental Steel Corp., Kokomo, Ind., died June 2 of a heart attack.

—o—

Albert C. Wischmeyer, 61, president and treasurer, Nunn Brass Works, and treasurer of K. Barthelmes Mfg. Co. Inc., both of Rochester, N. Y., died May 30.

—o—

Walter W. Wolf, 83, for years traffic manager of the Diamond Chain & Mfg. Co., Indianapolis, died recently.

—o—

Mrs. Helen M. Saunders Holmes, a former secretary of Saunders Machine & Tool Corp., Yonkers, N. Y., died recently. She was the widow of H. A. Holmes, a former treasurer of the Saunders company.

—o—

Roy S. Wildman, 61, vice president in charge of sales, American Brass Co., Waterbury, Conn., died June 7. He joined the company in 1903 and had served as vice president and general manager of the corporation's Ansonia, Conn., Division.

—o—

John W. Hubbard, 82, chairman of Hubbard & Co., Pittsburgh, died June 3 in Atlantic City, N. J.

—o—

Col. L. D. Hubbell, 79, onetime vice president of the Indian Motocycle Co., Springfield, Mass., died June 6.

—o—

Miss Dorothea E. Jones, 60, secretary and treasurer of Jones Machine Tool Works Inc., King of Prussia, Pa., died recently.

—o—

Frank J. Vlchek, 76, founder and president, Vlchek Tool Co., Cleveland, died June 10. He started his career with a small blacksmith shop, and developed his company into one of the largest manufacturing concerns making small tools.

EDWIN R. MOTCH

—o—

Frederick A. Preston, 63, since 1928 vice president, Poor & Co., Chicago, and chairman of its subsidiaries, the P. & M. Co. and Maintenance Equipment Co., both of Chicago, died June 8. In 1935 he was appointed chief of the Chicago Ordnance District, and was chairman of the advisory board at the time of his death.

—o—

Hal M. Nichols, 64, retired, head of the Sales Engineering Division, American Can Co., Chicago, died June 3 in Lake Worth, Fla.

—o—

Paul R. Beardsley, 77, treasurer and one of the founders of the Sealed Power Corp., Muskegon, Mich., died May 31.

—o—

Nathan Alexander, 46, vice president in charge of purchasing of the American Safety Razor Corp., Brooklyn, N. Y., died recently.

—o—

Walter N. Vance, 73, retired, vice president, Lyon Metal Products Co., Aurora, Ill., died June 2 in Chicago Heights, Ill.

—o—

John F. Byrne, 48, vice president of the Koppers Co., Pittsburgh, was killed in a recent plane crash at Bainbridge, Md.

Annealing Salt FOR 18—8

. . . reduces number of operations in annealing and flux removing processes of welded parts from 4 to 2. Procedure cuts time by 75 per cent. Bath does not require rectification, nor is it necessary to acid clean treated parts to remove all salt traces

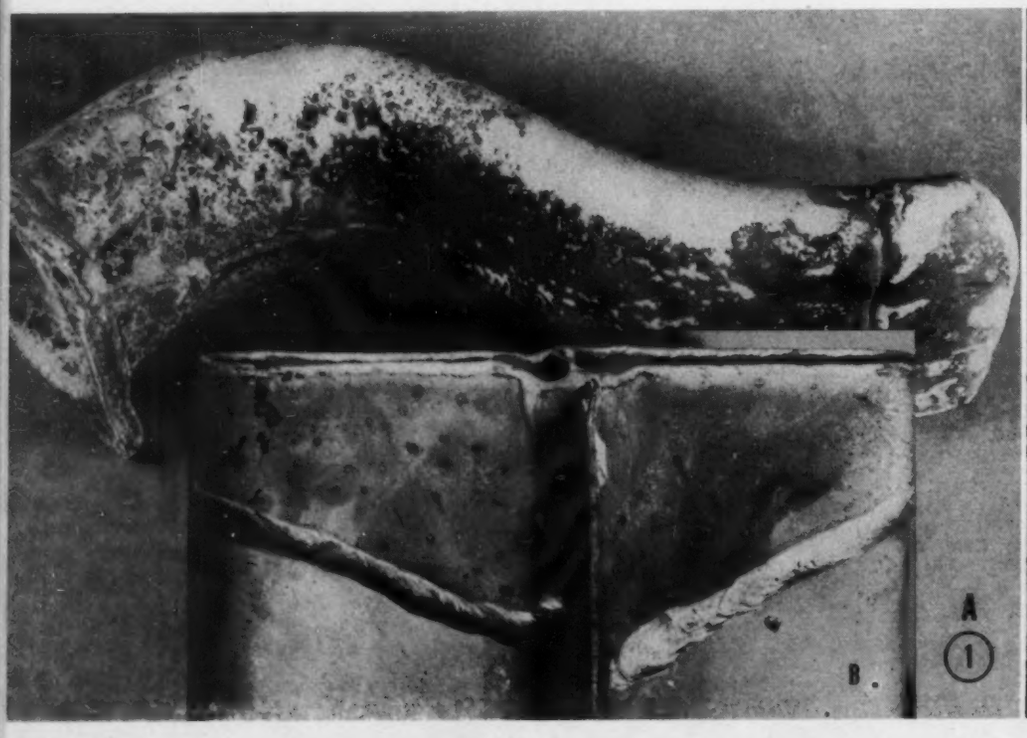
EVER PRESENT problem confronting the designers of each new high powered aircraft engine is the necessity for conveying the high temperature exhaust gases away from the engine as quickly as possible. These gases emerge from the engine ports at a temperature between 1650°-1800° F. They must be conducted away from the engine rapidly in order to prevent the burning of the cowling, engine nacelle and other surrounding structures. Ryan Aeronautical Co., San Diego, Calif., found that one of the few metals which proved completely satisfactory for this job is stainless steel.

In the process of developing better systems for carrying away engine exhaust gases, many new uses for these gases have been discovered. The exhaust gases are utilized for wing anti-icing, gun installation heating, warming of surface controls and cabins and turbo supercharging. Extensive use of stainless steel with the accompanying manufacturing processes such as welding, annealing, stamping, pickling, sandblasting, passivating and cleaning has provided the research laboratory with an opportunity to acquire a mass of knowledge on the behavior of this important metal.

Exhaust manifold parts are made from sheets of columbium or titanium stabilized stainless steel of the basic 18-8 type with modifications of finish and composition specified by the laboratory. These sheets are cut, stamped into half sections and tack-welded. Then they are trimmed and seam-welded by either atomic hydrogen or oxy-acetylene methods. After this welding operation, the parts must be annealed to remove the strains set up in the metal by the welding. This eliminates the possibility of failure in the critical area adjacent to the weld and also modifies the grain structure in the weld melt itself. The weld flux must be loosened by a de-fluxing process in an acid bath, and then removed by sandblasting. The schedule for these operations is:

(1) De-fluxing in an acid tank—15 min;
(2) Removal of flux by sandblasting—2 min per part;
(3) Annealing heat treatment by air furnace—12 min;
(4) Removal of scale by pickling in hot acid bath—30 min.

An analysis of the procedure indicates that there are 4 basic steps to perform the nec- (*Please turn to Page* 105)



By KEITH WHITCOMB
Chief of Electrochemical Section
Ryan Aeronautical Co.
San Diego, Calif.

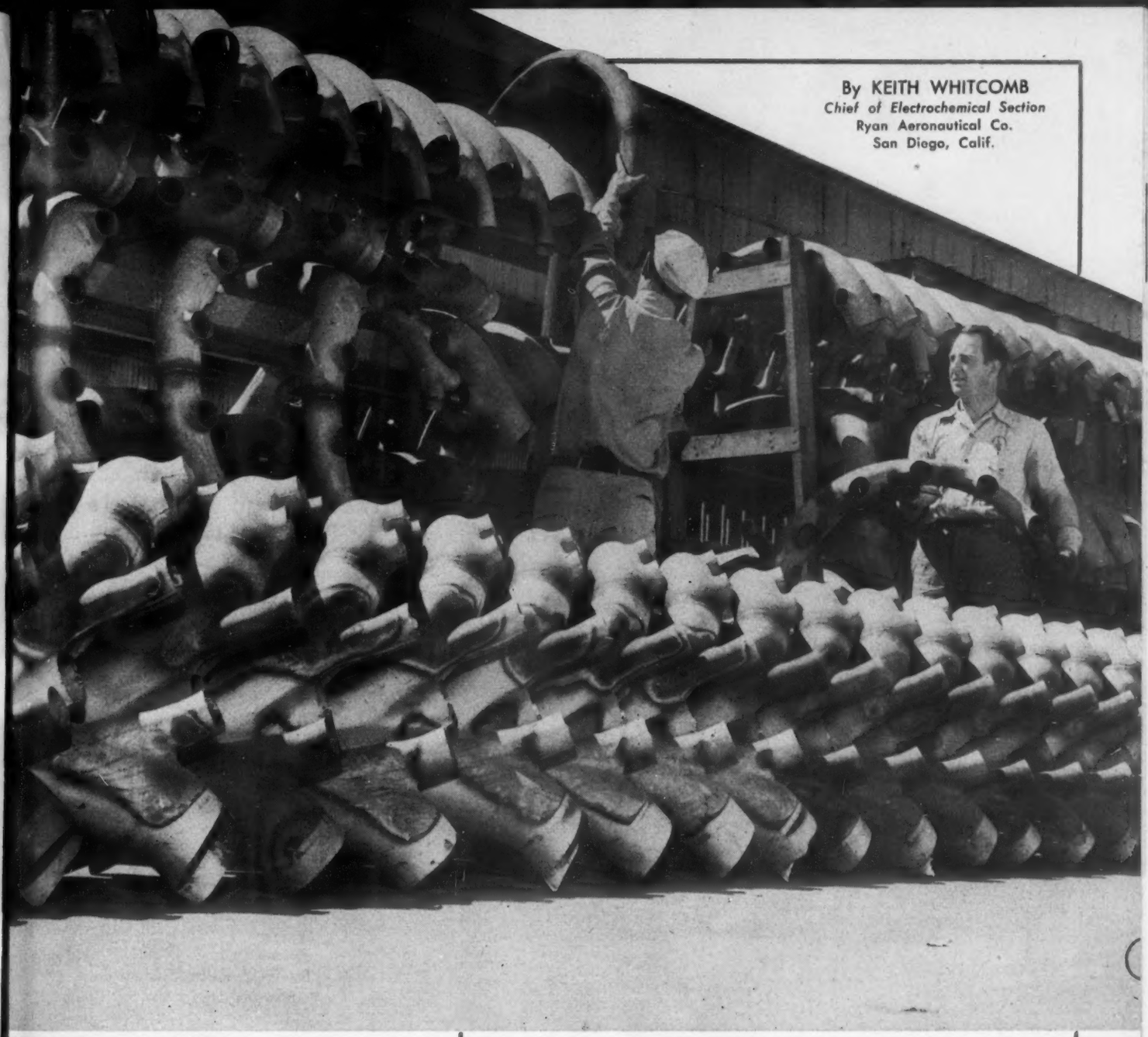


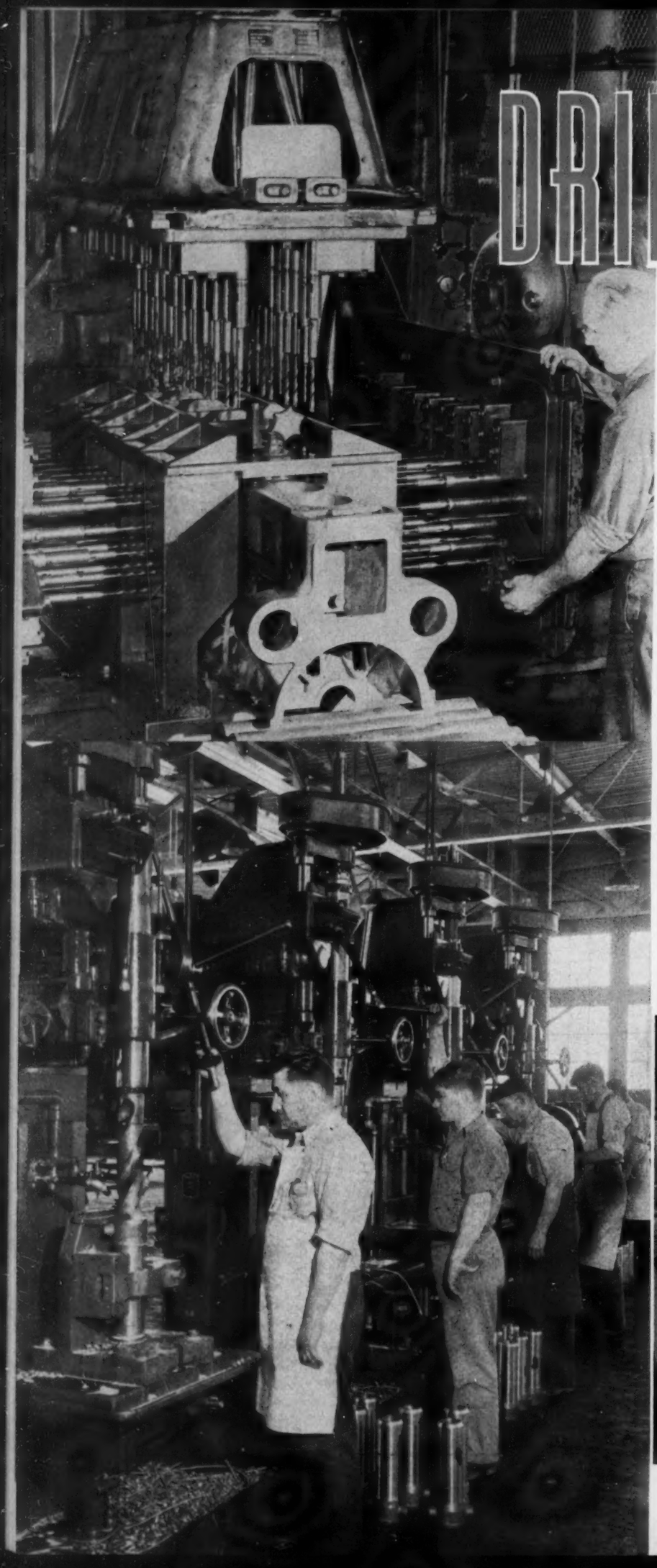
Fig. 1—(A) Exhaust manifold section heat treated in barium chloride type salt bath rectified with sodium chloride, pickled and allowed to stand in air for a few days. (B) This manifold part was badly corroded after a heat treatment by barium chloride type salt bath. It was then sandblasted to remove the corrosion. After being allowed to stand, rusting again set in with the pores acting as origins

Fig. 2—Salt annealing furnace used at Ryan Aeronautical Co. is covered by a rolling lid. Loading device is about to immerse a load of exhaust manifold parts in bath; quench tank is located in foreground

Fig. 3—Exhaust manifold sections being stacked. These parts have been seam-welded and annealed, then sections were joined by arc welding

PROPERTIES OF VARIOUS SALTS

	$BaCl_2$	Salt "A"	Salt "B"	Salt "C"	Salt "D"	Na_2Co_3
Fuming	D	D	C	A	A	A
Surface	A	A	A	C	C	A
Sludge	C	C	C	D	D	A
Quench	B	A	A	D	D	A
Color of part after water quench	Brown Green	Black	Brown	Bright	Bright	Black
Stand in air	D	D	D	B	B	A
Flux removal	D	D	C	B	B	A
Intergranular attack	D	B	C	D	A	B
Drag out	A	A	A	C	C	A
Removal of salt by pickling	C	B	B	A	A	A
Rectification	Required	Required	Required	Required	Required	Not Required
Operating temperature °F	1900	1750	1750	1800	1800	1700



DRILLING...

Part Two of a Series, This one Dealing with the Rise and Development of "Mass Production of Holes", and the Role Played Therein by

MODERN MACHINE TOOLS

By GUY HUBBARD
Machine Tool Editor, Steel

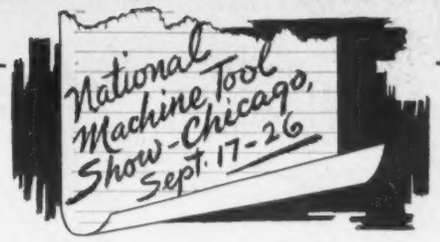
DRILLING is a basic machine shop technique which literally is "as old as the hills". Unquestionably drilling was suggested to primitive man by the natural process by which "pot holes" are drilled into rock ledges in the beds of streams. Stones of harder quality than the rock ledge lodge at a given spot and constantly are whirled by the current of water. Aided by the cutting action of sharp, hard grains of sand, the supply of which is constantly renewed by the flowing water, these natural water power-driven drills produce holes of remarkable roundness and straightness, to amazing depths in many cases.

Even today, stone still is machined and drilled by simple tools aided and abetted by water and sand, and—stranger even than that—some of the latest and most accurate systems of surface finishing and sizing of metal parts, including holes therein, are closely related to nature's own method of machining hard materials.

Following nature's suggestion, prehistoric man attained a high degree of skill in drilling holes in shells, stones and even in flints and gems—originally by drills spun between the palms of the hands, later by "bow drills" closely related to the bow lathes described in my article on "Turning" which appeared in the June 9, 1947 issue of STEEL.

There is close relationship between the drilling of holes and two other of mankind's greatest inventions—that of artificial fire-making and the bow-and-arrow combination as a weapon. The hand-spun drill undoubtedly was the origin of artificial fire-making, but whether the bow-and-arrow or the bow drill came first is a question on a par with "Which came first, the chicken or the egg?"

In any event, the bow drill—like the potter's wheel, the bow lathe and the pole lathe—is a machine tool which has come out of dim antiquity and still is with us today. Not many years ago, many an American shopman's chest of tools included hand drills which were bow-driven. Only a few months ago my good friend and fellow machine shop historian, W. H. Nichols of Waltham, Mass., showed me some beautiful little bow drills in his collection of watchmaker's tools—counterparts of which still are in every day use in Switzerland.



This article merely gives a few hints of the numerous manifestations of drilling which will be in evidence throughout the duration of the National Machine Tool Show.

Of the 1000 or more machine tools demonstrated under power and under production conditions at this Big Show in Chicago, several hundred will be drilling machines—and "the last word" in drilling machines—or will include spectacular drilling operations somewhere in their cycles of operations.

We in this country really have gone very far, very fast in the development of machine tools, including drilling machinery. We still are going fast. How far, no one can foresee. Let's take a quick look at the drilling machinery picture as of now.

Drilling as we know it today as a production machine shop operation was originally developed to a fairly high state by the makers of firearms, both cannon and small arms. The power-driven machines which they invented were rather primitive, but they did have the advantage of always running in one direction. This eliminated the idle or nonproductive back stroke of the bow-driven tools. In terms of modern machine shop economics, that was a big step in the right direction.

Although many highly ingenious vertical spindle drilling machines, many of them with cone belt drives and back gears for speed changes, were built in the United States prior to the Civil War, their usefulness was limited by the fact that only flat drills then were available. "The flat drill", says Joshua Rose in his historic volume on machine shop practice, "has the amazing properties of being able to drill holes which are neither round nor straight". Just as repeating guns didn't get far with black powder, or portable cameras far with wet plates, even the most ingenious drilling machines didn't get far with flat drills.

It was the invention of the twist drill that really gave metal drilling its big boost. Tool engineers can take a lot of credit for that. So also can machine tool builders who developed the machines for milling the flutes, backing off the periphery, grinding, etc. It is interesting to note in passing that Brown & Sharpe developed their first universal milling machine in 1861 (*Please turn to Page* 134)

Upper left—Baush three-way multiple drilling machine set up for jig drilling of top and both sides of a large cylinder block casting

Lower left—Battery of Baker upright drilling machines, employing big twist drills to rough machine bores of landing gear cylinders

Near left—Foote-Burt transfer machine with multiple heads for drilling and related operations on aircraft engine parts. Signal lights on control pulpit indicate conditions at every work station

Production of *New*

Fig. 1—This is view inside the Freeport Works showing the axial air-gap mechanical stator winding inserters

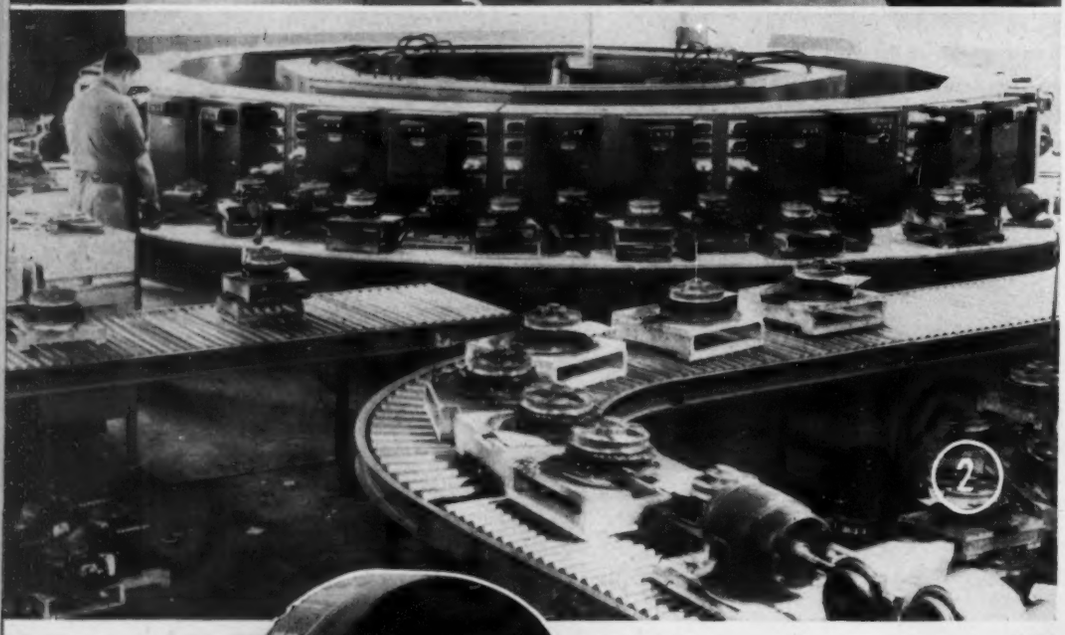
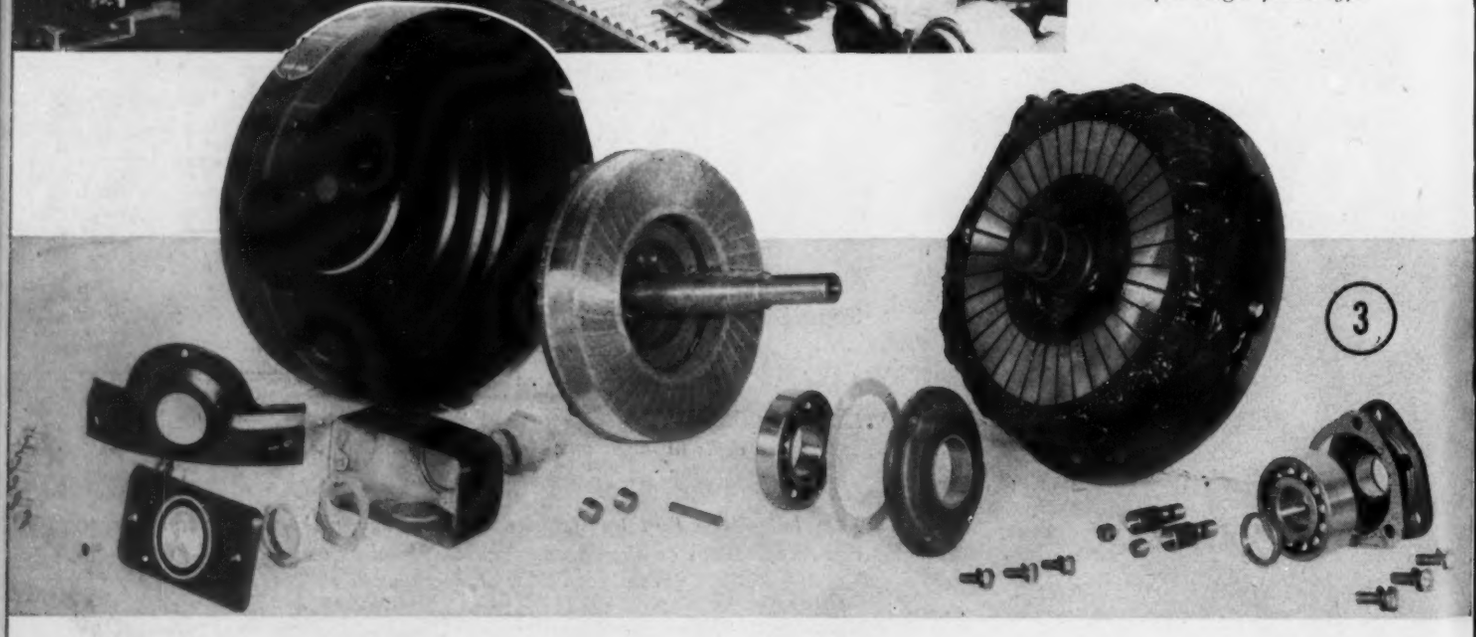


Fig. 2—Circular heat run table used in the Freeport Works of Fairbanks-Morse to test run axial air-gap motors. Table, in background, revolves very slowly. Operator places motor on table, connects it to leads, and it goes through its test run while making the 360-degree circuit, coming back to the operator for final check and removal

Fig. 3—Disassembled view of horizontal type motor

Fig. 4—Vertical type motor as applied to floor brush machine. Unit is a ¾-hp, 1800 rpm single phase type



Motor

. . . involves use of specialized manufacturing techniques in Fairbanks-Morse's Freeport plant. Axial air-gap design makes motor easily adaptable to machine tools, gear units and other equipment where compactness and modernized appearance are essential

SOME unique manufacturing processes were developed by Fairbanks, Morse & Co., Chicago, in building its new axial air-gap electric motor. Although principles of design are not entirely new, it does include innovations that are termed radical. It is distinguished by the fact that its magnetic lines of force follow a path to the shaft, or axis of rotation, as compared to a radial path taken by the magnetic flux in the so-called conventional motor.

Outstanding features of the alternating current motor are space and weight reduction, the new unit being less than half the size of the conventional type, weighing less by approximately 30 per cent, yet retaining all necessary characteristics of sturdiness and power requirements. A brief explanation of the design and construction of the motor shows how the space and weight saving features are accomplished.

Whether the form of the basic elements of a motor, stator and rotor, are in the shape of a solid or hollow cylinder or made of thick disks is of no practical difference so far as electro-magnetic design is concerned. It is not very difficult to transpose the fundamental concepts of design from data based on a cylindrical form to fit the needs of a design of the plate or disk type. Real problem lies in the method of forming disks and the punching of slots for the stator and rotor windings.

Coiling strip steel into the shape of a thick disk and then forming slots by machining or broaching is laborious and uneconomical. To make it practical, apparatus had to be developed that would punch the slots and coil and form the disk. Uniform spacing of the slots is not possible because the slots would not line up when coiled. Controlling the slot spacing by coiling and punching simultaneously is also not practical because this results in the slots lining up in an Archimedes spiral and, as such, it would be impossible to insert the windings. It was, therefore, necessary to design and develop machinery that would not only punch and coil the strip, but also transform the line up of slots from an Archimedes spiral to a straight line. Successful development of apparatus to accomplish this made the manufacture of the axial air gap motor commercially practical.

Construction of stator and rotor cores was not the only problem in the development of a practical motor. The first motors of this type employed conventional frames and bearing brackets for the supporting structure. As a result they were difficult to assemble, and machining tolerances contributed to inaccuracies of air gaps. The solution of assembly problems and air gap tolerances was the development of the so-called "inside frame" in which the supporting member of the stator also supports the bearings. This is accomplished by a hollow cylindrical extension through the center of the coils, the extension being an integral part of the frame. The inner race of the rotor and bearing is stationary. The stator and bearing is conventionally mounted, fixed in position and is a double row type to take care of the magnetic thrust between the stator and rotor.

Inside frame construction results in a material reduction in weight and size of the motor. It eliminates air gap inaccuracies that occur if separate members were required for the support of the bearings, and it permits the length of the gap to be controlled by the axial measurement of three dimensions, the shaft length and rotor and stator facing dimensions.

Assembly of the stator and rotor cores to the supporting frame and spider respectively also presented a dif-

Fig. 5 — Frame comparison of conventional 5 hp, 1800 rpm air-gap type of motor with axial air-gap type of similar capacity. Both are for vertical mounting

ficult problem which was solved in a simple and clever manner. The first experimental motors of this type were constructed with cast steel spiders and frames and the cores supported by welding through radial slots in the frame and spider. The welding operation, however, invariably distorted the assembly so that it was necessary to remachine after welding. To eliminate this expensive remachining, a novel construction was conceived in which steel inserts were employed to weld the core in place to cast iron frames and spiders. The use of inserts eliminated welded distortion and subsequent remachining. In actual production the inserts are now cast enbloc.

The axial air gap motor, with a rotor diameter equal to that of the stator core, requires a rotor of greater mechanical strength than that used in conventional designs. The one piece centrifugally cast "copperspun" rotor provides this added strength with an adequate margin of safety.

Development of a number of innovations in design and manufacturing processes then were necessary before a motor of this type that could be built with modern production methods.

Several features distinguish the axial air gap motor from conventional motor. The first and most outstanding factor is the reduction in size. The length is approximately one-half that of the conventional motor with a diameter of 1 to 2-in. larger. The accompanying chart, Fig. 6, illustrates the size of axial air gap motor from 1 to 10 hp compared to that of standard NEMA conventional frame sizes of the same horsepower and speed rating.

Substantial reduction in weight of the axial air gap motor is principally due to the large area of corner waste in the conventional motor lamination. About the only waste of core steel in the axial air gap unit is the material that is punched out to form the stator and rotor slots.

The motor also is easy to cool and ventilate. Its rotor diameter is large, fans are cast integral with the spider and most of the coil extensions are on the outside where a large volume of air flows over them. It is almost an axiom among motor designers that if the rotor of a motor is cool, the rest of the motor will be cool. The rotor, fully exposed to ventilation, offers no problem in the axial air gap motor.

Primarily a flange mounted machine, the axial air gap motor is suitable for either horizontal or vertical operation. The motor itself is the same whether used horizontally or vertically. Only the cover is changed. As a flange mounted motor it has much less overhang. The frame and bearing supports are of one piece with the result that the accuracy of the flange such as face runout, concentricity of diameter, shaft runout, etc., can be held to much closer limits than is the case where the flange and supporting members are assembled of several parts. This is particularly important in gear motors and other direct applications where accuracy is essential.

For chain, belt, or V-belt drives, a sliding base is generally used with a conventional motor to provide belt adjustment. With the axial air gap motor this is accomplished by use of a pivot base having a three point suspension. Belt tension is adjusted by pivoting the motor about the top supporting screw. Manufacturers of machinery often can apply the axial air gap motor with belt drive by simply incorporating the pivot and slots in the frame of the machines, thereby (*Please turn to Page* 109)

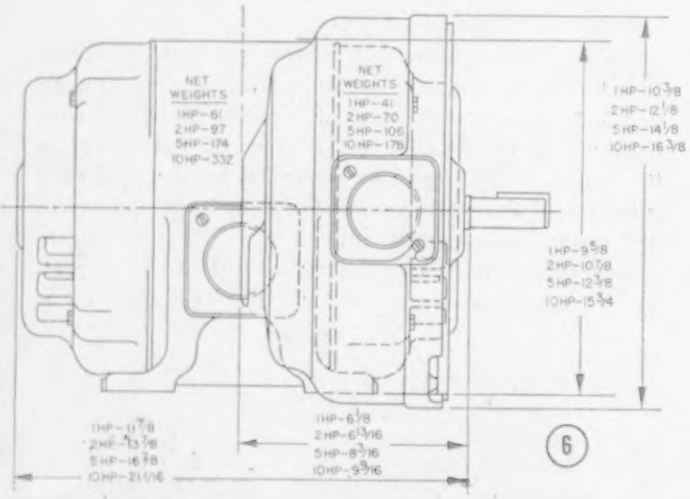
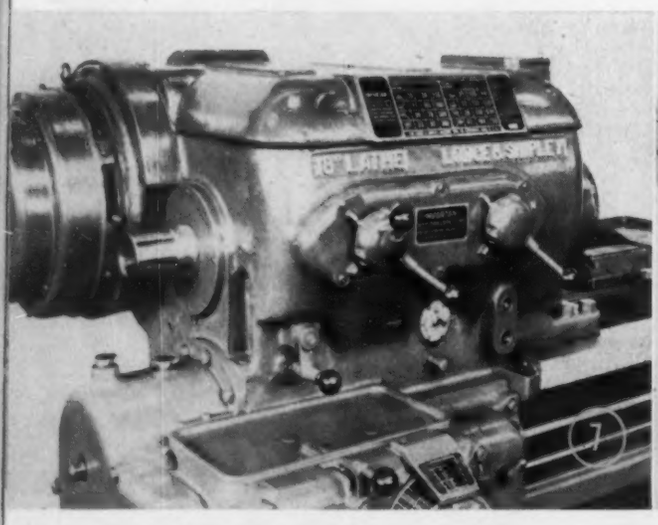
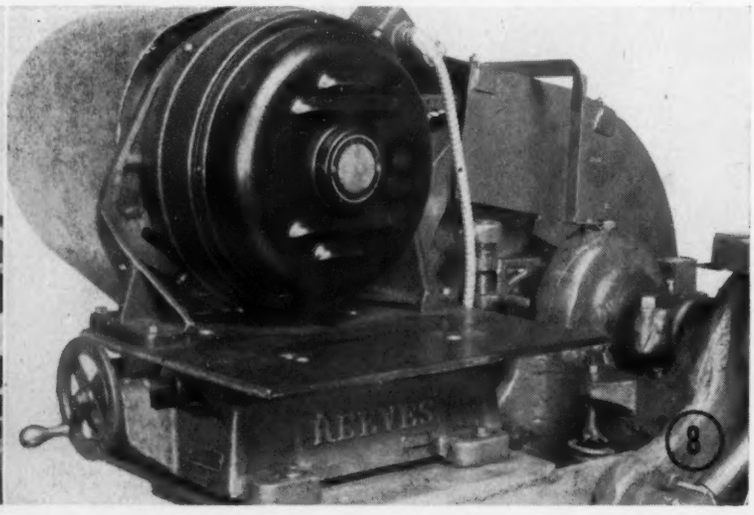


Fig. 6—Comparative dimensions, weights of conventional horizontal and axial air-gap horizontal motors

Fig. 7—View showing use of new motor design as applied to headstock of a Lodge & Shipley 18-in. lathe

Fig. 8—Application of new motor with pivot base for variable belt drive on a punch press





Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

BEN WATERMAN RETIRES: Machine tool men seldom retire. Apparently there is no age limit in that business. The noted inventor Christopher Miner Spencer was active on "automatic" developments well into his 90th year. Even his was not the top record. Others actually have surpassed that 90 year record—among them, I believe, Baxter D. Whitney.

Ben F. Waterman has been a Brown & Sharpe man for more than 50 years, during most of which he has been concerned primarily with gear problems rather than those of machine tool building—even though the two are quite closely related. At the recent annual meeting of the American Gear Manufacturers Association, Mr. Waterman casually mentioned to some of his old friends that from now on he will devote most of his time to hobbies other than gearing.

As such news does, this news got around. In the midst of the annual dinner, Mr. Waterman was greatly surprised when all of a sudden he found himself the subject of a big ovation. He certainly had it coming to him, not only on the basis of his long and faithful service with his company, but also as one of the pioneers in the Association, the Dean of its past-presidents (1930-32), and one of its three Honorary Life Members. We all hope that Ben Waterman will take full advantage of that Honorary Life Membership by continuing to attend AGMA meetings for years.

WAITING FOR THE SHOE: Have you ever had that experience of waiting in suspense for the man upstairs in a small country hotel to drop his other shoe on the floor? If you have, you will appreciate what I have been going through since my return from the AGMA meeting.

The first shoe dropped when I glanced at a caption in my article on "Turning" which appeared in the June 9 issue of STEEL. Just too late to do anything about it, I spotted a misprint in this caption on Page 75 which credited National Acme Co. with a new single spindle automatic capable of turning out bearing rings—"from high tensile seamless steel tubing up to 124 in. diameter."

The second shoe hasn't dropped yet, but it will when the phone rings and it proves to be someone from National Acme demanding, "How come you make out our big 'single' to be almost ten times as big as it is?" All I can say is, "That is a fair question," inasmuch as the capacity of this machine actually is 12¼ in.

While I apologize to my friends at National Acme for the misprint, at the same time I do want to emphasize the fact that an automatic which will handle heavy steel tubing up to 12¼-in. diameter through its spindle is a *whale of a big automatic!*

FRED COLVIN'S BOOK: During recent weeks I have received a number of communications from such observing people as Jules Dierckx, Granger Davenport and Fred Wittner, in this vein: "Did you know that Fred Colvin mentions you in his autobiography?"

Not only am I aware of it, but also I am exceedingly proud of a tribute from "The Old Master" himself on the flyleaf of my personal copy of "60 Years With Men and Machines". This inscription reads: "To Guy Hubbard, to whom I am indebted for much historical data. (Signed) Fred H. Colvin." This book means more to me than would a copy of "Rip Van Winkle" personally inscribed by Washington Irving and Joseph Jefferson.

I have been one of Fred Colvin's thousands of admirers since the days when I began to help myself to back numbers of engineering and trade journals from a pile in George O. Gridley's basement in Windsor, Vermont, about the time of the Russo-Japanese war. I used to see Fred in person up there, even before I ever saw another machinery editor from New York City (the "Big City", we called it) by the name of Ralph Flanders.

Ralph liked it so well in Vermont that he finally settled in Springfield. Now he has written the foreword to Fred's autobiography, signing it "Ralph E. Flanders, United States Senator, State of Vermont". Let that be an inspiration to any young man who aspires to write about machine tools and machine shop practice!

Fred Colvin learned machine shop practice "the hard way", starting his career as a machinist apprentice with the Rue Mfg. Co., 211 Race street, Philadelphia, on July 5, 1883. His first published work appeared in the *American Machinist* of April 3, 1886. That is when the "writing bug" first bit him. That bite evantually proved fatal to his machine shop career, but it certainly was a great thing for industrial journalism—of which at 80 he is the honored and actively working Dean.

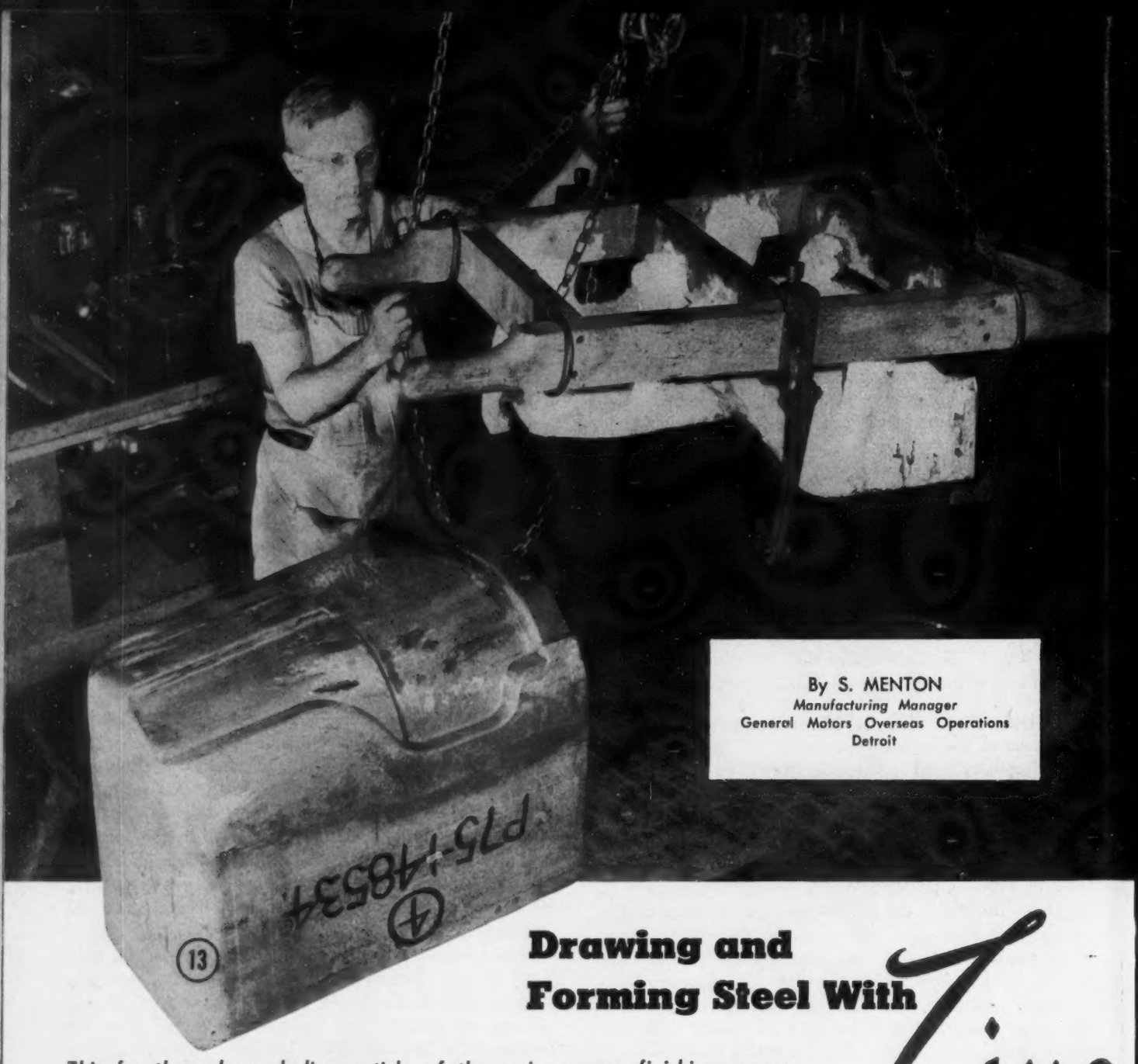
Here's what Senator Ralph Flanders says in the foreword to Fred's autobiography (and I hope that some day I can write a similar one for Ralph's biography): "It was a happy thought on Fred Colvin's part to put in print a record of his long and active life.

"Fred Colvin occupies a unique position in the machine tool industry. He has seen in his lifetime the transformation of that industry from an accessory of industrial development to firm establishment as its foundation. He has watched the development of the machine tool from a simple means of getting useful things done, to the point where it embodies in its design and operation the transfer of the skill of the exceptional mechanic and engineer, in usable form, into the hands of hundreds of thousands and even millions of operatives.

"It is this function of the transfer of skill that has made our nation supreme among the nations of the world in industrial might.

"In this process Fred Colvin has been more than a detached observer. He has been an intimate part of it. He has traveled the country over. His native ability and ingratiating personality have led to close friendships with the men who were active in the industrial process. He has made his own great contributions to our progress. His story is well worth reading."

I heartily agree that Fred's story is well worth reading. Copies are available from Whittlesey House, New York 18, N. Y., for $3.50.



By S. MENTON
Manufacturing Manager
General Motors Overseas Operations
Detroit

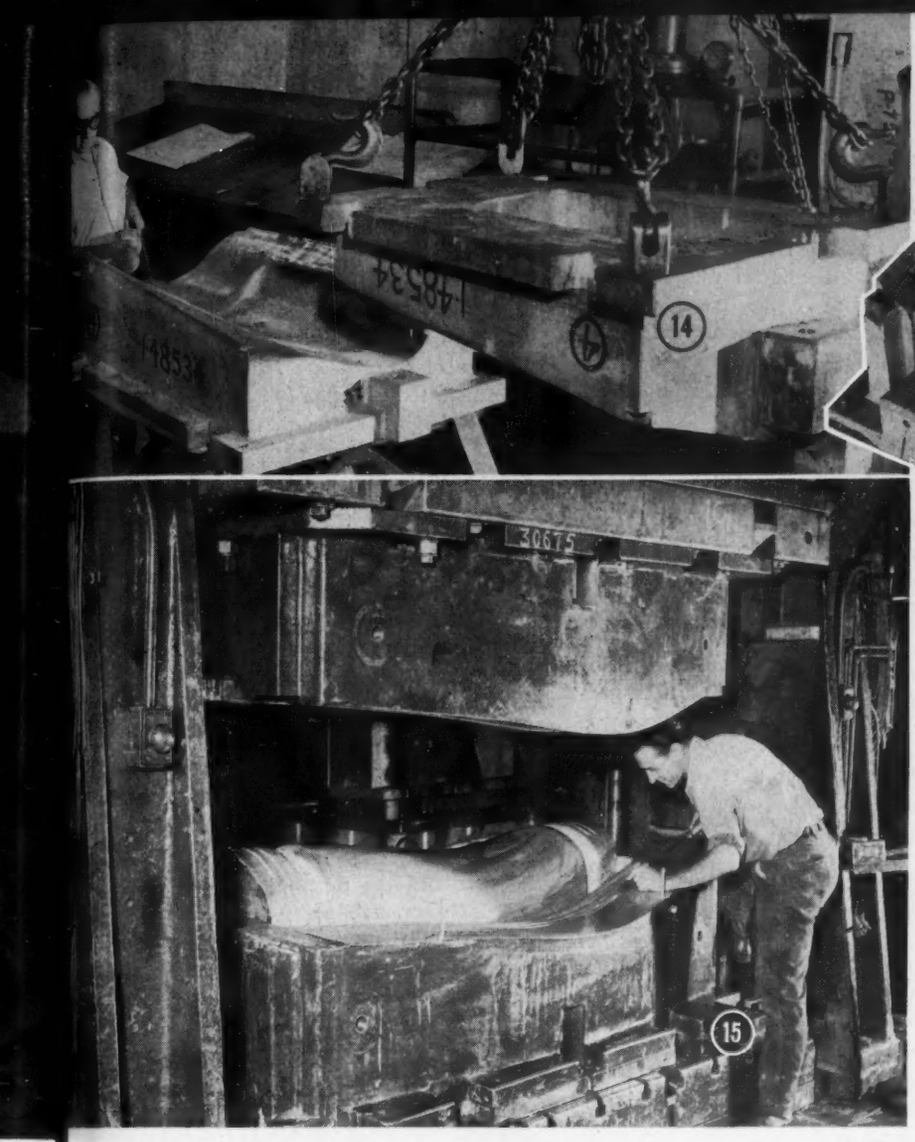
Drawing and Forming Steel With Zinc

This fourth and concluding article of the series covers finishing operations on draw and forming dies, press tryouts, pressure equalizing blocks, rebuilding or modifying dies, as well as other applications

FINISHING of Kirksite draw and forming dies is not complicated and in some respects the procedure is a reversal of that usually followed with dies of conventional materials. Conventional castings contain a surplus of material as a provision against irregularities in shrink and consequent warping, therefore a number of varied operations are required in order to remove this excess; most of these operations are not required on Kirksite and the work of preparing the die faces can be started immediately upon receipt of the casting from the foundry. Difference in processing procedure lies in the fact that iron and steel dies are routed through various machining operations before the matching faces can be finished, while machining operations are generally performed on these zinc base dies after the matching surfaces have been obtained.

A high degree of skill is required to process cast iron and steel dies. This applies particularly to plotting and laying out machining lines to remove excess material on the bottom, sides and top of the die components. It is necessary to route them through planing, milling, shaping, slotting, drilling, etc., prior to the removal of excess material on the die faces. The latter work is generally done on Keller machines, although hand work by chipping and grinding can be substituted at increased costs. Aside from the machine work which is common to all dies regardless of material used, including provisions for leader pins, guide blocks, inserts, etc., the principal layout and machining work of Kirksite dies involves leveling off the reverse faces of the die components for attachment to the press. In some cases the vertical walls also must be machined to eliminate taper resulting from draft in the patterns. Profiling operations requiring Keller machines are not necessary.

Equipment required in the die shop for the surfacing, machining and finishing of dies, either fixed or



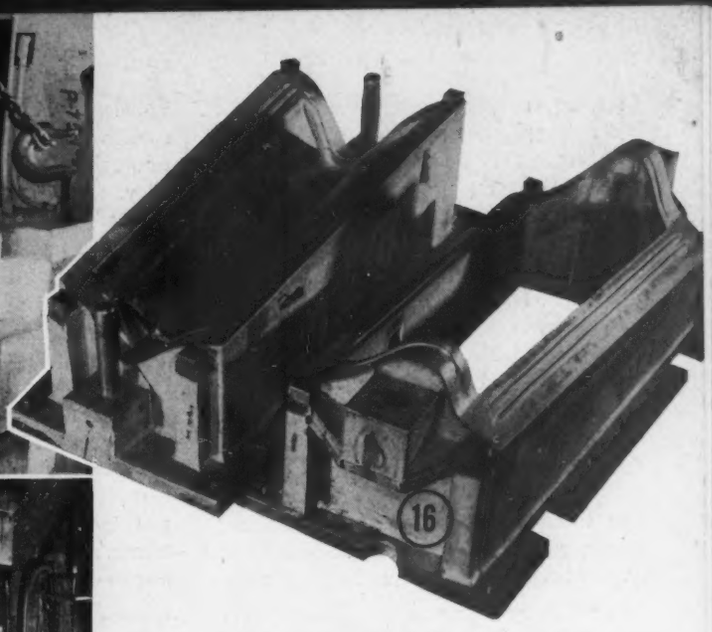


Fig. 13—Method of using a spotting pattern on punch component to determine high spots for proper finishing. Pattern is coated with slow drying bright color paint and lowered into firm contact with casting

Fig. 14—Male draw ring being used as pattern in spotting corresponding female section

Fig. 15—Zinc alloy die set mounted in press for tryout. Operator is putting finishing touches on draw ring surface

Fig. 16—Showing position of steel spacer blocks at four corners of draw die rings. Blocks are used for equalized pressure

Alloy Dies

portable power equipment, is of a standard nature. The machining of the alloy is similar to that of copper, and as both metals have a tendency to pack the cutting tool, those used in the machining of Kirksite should have a liberal amount of chip clearance and a 6 to 7° rake. For heavy cuts, it is the practice at one plant to use a portable air grinder with a high-speed steel cutter 1-in. thick, approximately 3¼-in. in diameter and having 35 teeth. When necessary, this tool will remove a large amount of metal in a short time.

To remove high spots from contact faces when spotting die sections after the surfaces have roughed out, miniature cutters of various shapes and sizes may be used together with similarly shaped grinding wheels. One type of grinding wheel specially designed for work on this alloy is impregnated with a lubricant which softens up from the heat generated during the grinding operation. This serves to oil and loosen the particles of the alloy adhering to the wheel so that they can be thrown off by centrifugal force.

Sawing of metal is not machining in the true technical sense, but a certain amount is necessary on Kirksite dies in making removable sections and other items. The alloy can best be cut with a bandsaw having a ¾-in. blade, 8 teeth to the inch, 0.050-in. set, 10° rake and "A" temper. The blade should travel at the rate of 150 fpm with a feed pressure of 75 lb and a cutting rate of 9.37 sq in. per min.

Dies usually are received in the toolroom in a rough-trimmed condition, that is, the gate horn or prue, rough edges and run outs are knocked off or trimmed. The first operation, therefore, is to fit eyebolts for handling the die components before commencing finishing and machining operations. Bolts 1-in. in diameter are used on all castings up to 10,000 lb in weight both as a matter of safety and for ease in handling. These are inserted into the casting to a depth of 2-in., or twice the bolt diameter. Bolts which are smaller in diameter, or are inserted to a lesser depth, may tear or pull out in handling.

One of the die components, usually the male punch, is taken first for surface finishing. All major surface roughness is initially removed by chipping and grinding. This is followed by processes designed to obtain an accurate

surface contour to design specification. The irregularities or high spots on the casting, which have to be removed, are detected by the use of templates which are cut along sectional lines on the work drawing; or by the use of a pattern of the opposite member which is made to the actual size of the die. Patterns are considered essential in spotting forms of irregular shape.

Pattern to be used for spotting purposes is painted with a slow drying bright-colored paint, such as red lead, and then is superimposed on the casting. Rapping the pattern a few times serves to transfer the paint to the prominent high spots on the die member. These are then removed by milling, grinding, scraping, filing and polishing. Generally a series of such operations is necessary, until the face of the punch is spotted to within 0.010-in. or less of the pattern, or actual dimensions. As the high spots become less prominent and fewer in number, the tools are changed from coarse cutters to finer, and then from cutters to grinding wheels, files, hand scrappers and, finally, emery cloth for polishing. Particular care must be taken with this component, not only because it is the principal pressure member but also because it serves as the master for spotting the opposite member when it is required.

When an accurate surface is obtained on the male member, practically the same operations are carried out on the female member, except that in this case the male component acts in place of a spotting pattern. In this operation, the opposing faces can be brushed with such contrasting colors as red lead and Prussian blue to bring out the high spots which otherwise would not show up as sharply on the shiny surface of the alloy. The male member generally is selected as the master from which to spot the female since it is the prime mover against the metal to be pressed and the finish of the panel depends more upon the accuracy of this component than upon the female. In either case, as much time as may be needed to obtain perfectly matching surfaces should be taken. It is not only easier to work on the die when out of the press than it is when in the press, but the machine is not tied up so long for the tryout. This is particularly true if the female section is overhead.

Mating Draw Rings

When draw or binder rings are to be mated, again the male member is generally selected as the master and the contour is surfaced as close to actual drawing or pattern dimensions as is practicable. As the face of these members is fairly regular, patterns are not usually used for spotting because fairly accurate surfaces can be obtained without them. Cast in draw beads, if used, are checked in the same manner as are the principal contours. When a satisfactory surface has been obtained, the male draw ring is used as a pattern for spotting the corresponding female section.

Principal layout problem encountered with Kirksite castings involves balancing the die and marking off the reverse faces, or bases, of the die components so that the central pressure point on the punch will be perpendicular to the press bed and platen. The objective is to avoid positioning the die members in such a way that the sheet is being drawn, pushed, dragged and pulled simultaneously as a result of an angular contact. Theoretically, the position of base lines which are to be scribed on the die component should be readily established by reference to the working drawing. In actuality, when the vagaries of castings are taken into consideration, the diemaker is in a better position to locate them correctly and, based on practical experience in press work, to improve upon the layout indicated.

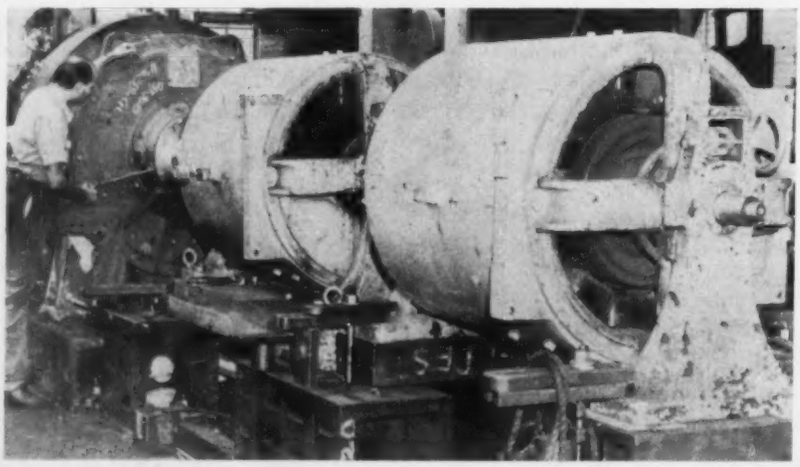
Once these base lines have been established on the male punch and opposing female member, similar lines must be scribed off on the draw or binder rings. However, in addition to determining the proper balance for these members, care must be taken that their contours will be in the correct relationship to those of the central die members. This is essential in order that the sheet metal blank will be in the proper position to be drawn by the punch.

Milling off bases and finishing the inside walls of the rings, and the vertical walls of the punch and corresponding female, should be about the only machining operation of any consequence that will have to be performed if proper provisions have been made in the patternmaking and molding department. Leader pin and bolt holes may have to be drilled and threaded and flat sections such as the surfaces for equalizer blocks may have to be milled off, but these are comparatively minor operations. After the machining operations have been completed, the die members should be rechecked to determine if any deficiencies in matching surfaces have been brought out as a result, in which case appropriate corrective measures should be taken before the die is placed in a press for tryout.

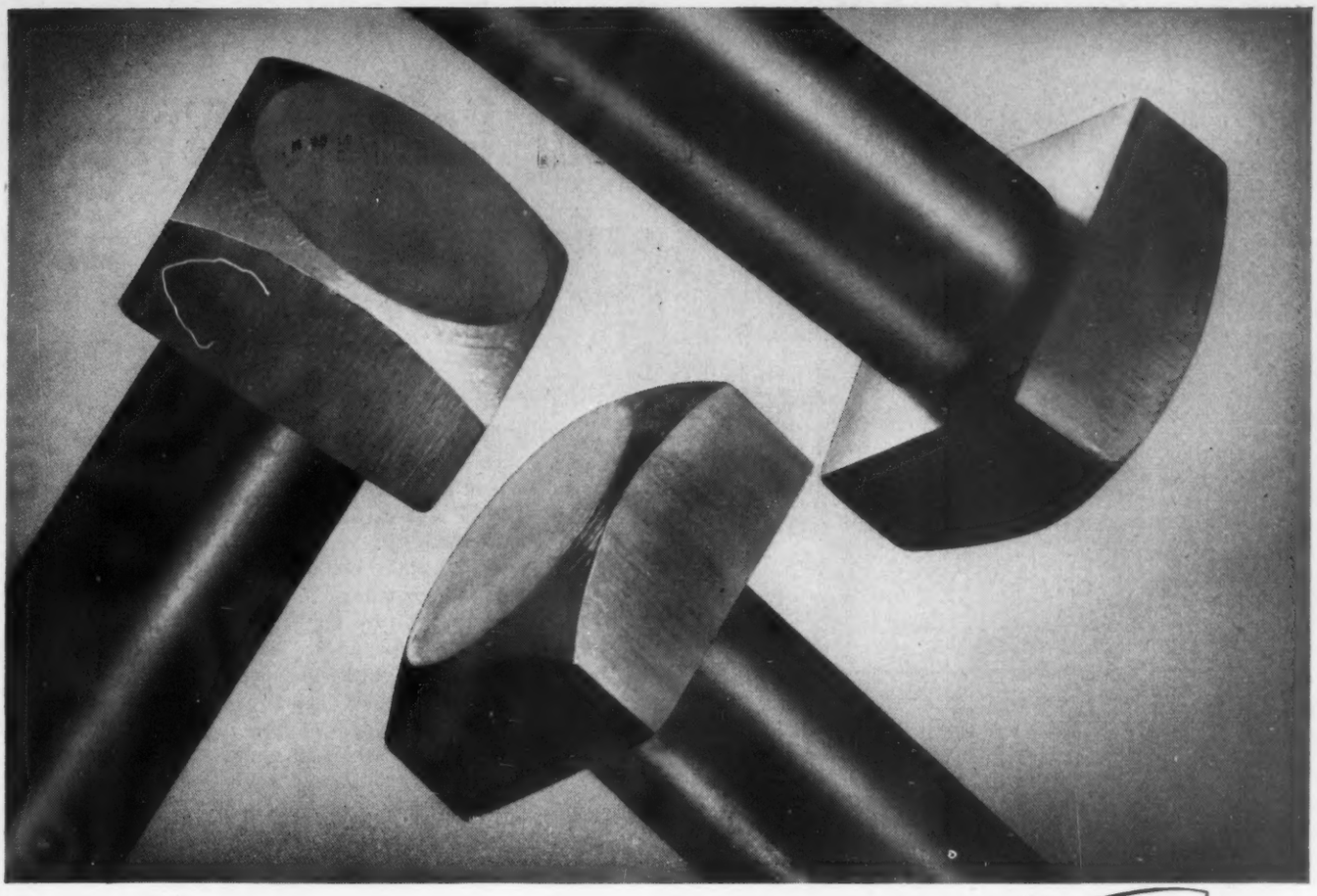
Term "tryout" is self-explanatory in that this is the first opportunity to test out the die in the performance of its prescribed function, namely, to make the panel into the form called for on the design drawing. The tryout of Kirksite dies does not present any problem not encountered with dies of cast iron, steel or other materials. The die assembly is conveyed to the press as a unit and secured in the press in proper alignment. Before operating the press, the dies should be examined to make certain that all chips, emery dust and dirt have been removed. If such materials are allowed to remain on the dies, the pressure of the press imbeds them in the die surfaces where their presence will cause imperfections in the metal being drawn.

The press then may be turned over a few times in progressive stages, before a panel is tried out, to see if any major de-

(*Please turn to Page* 122)



HUGE DYNAMOMETERS: Shown here being aligned for tests are two of the largest eddy current power absorbing machines ever built at General Electric Co.'s Ft. Wayne Works. Capable of measuring power, they will be used at Wright Aeronautical Corp., Wood-Ridge, N. J., to load a prime mover, or power source, which spins at a high speed. Power of the prime mover will be transmitted to the machines through a torque meter and gear reducer. These 5000-hp water-cooled machines cannot operate as motors, but can absorb huge amounts of power



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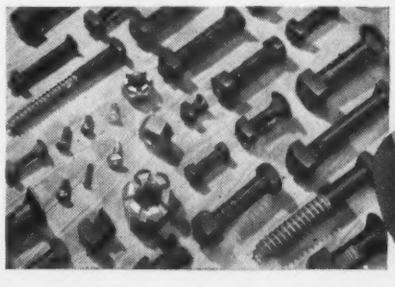

Flat Car Conveyor System

SERVES 66-INCH HOT STRIP MILL

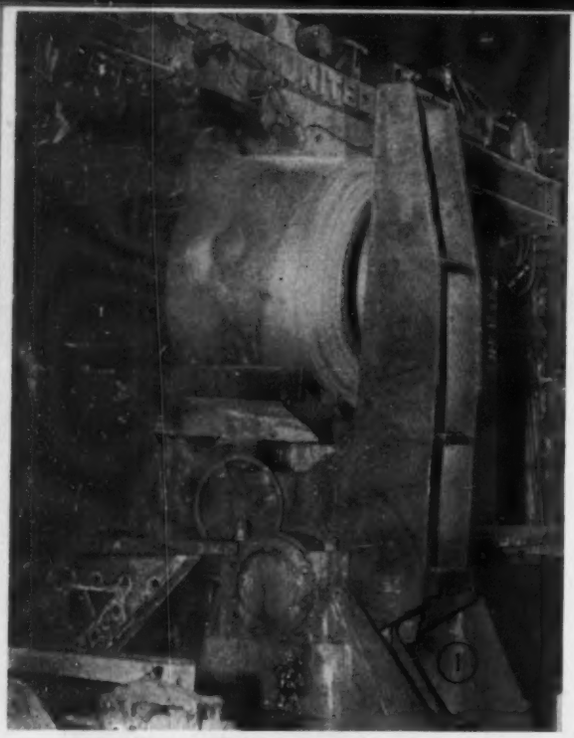

Fig. 1—Coil of hot strip about to be transferred from coiler to conveyor

WHAT is reported to be the only strip steel conveyor system of its kind in the world was recently placed in operation at the new 66-in. hot strip mill department of the Weirton Steel Co., Weirton, W. Va. Built beneath the floor level of the 66-in. hot mill building and the adjacent pickler building, the conveyor consists of 126 small flat cars that are coupled together on an endless oval track. Total distance around the oval path of the conveyor is 636 ft; from end to end the oval is 300 ft.

Average length of time the coil is on the conveyor is 120 min. Average temperature of a coil when it is placed on the conveyor by the turn-down rig is 1000 to 1200° F. When the coil comes off the conveyor to go up the elevator conveyor enroute to the picklers, the temperature has dropped to 200 to 300° F.

Operated by electrical controls, the conveyor brings empty cars into position before the 66-in. hot mill reels, receives a 6500-lb coil, then goes forward. On the opposite side of the conveyor under the pickler building, one coil is unloaded each time the conveyor stops. The coils are raised to floor level in the pickling building to be started through the many finishing processes in which hot strip steel is made into tin plate or various types of steel sheets.

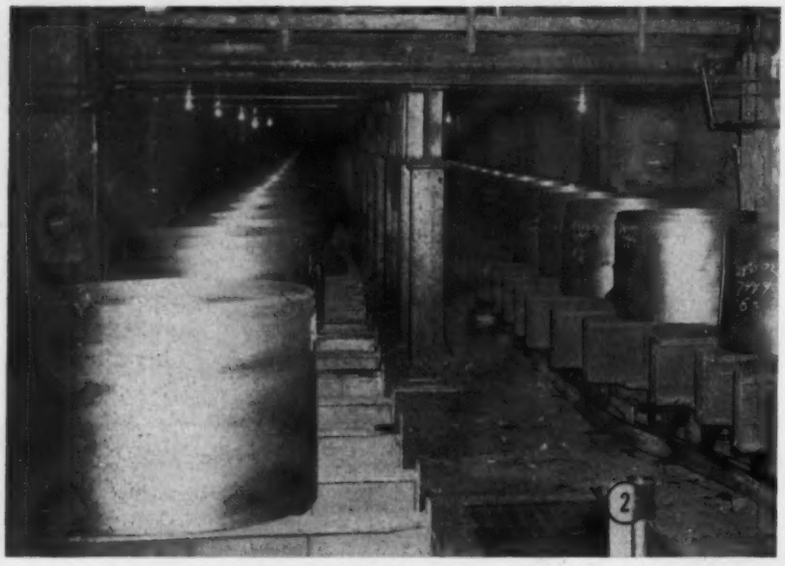

Fig. 2—Underground conveyor system which moves coils from the reels to pickling department

Fig. 3 — Cradle which takes coil from reel and deposits it on conveyor system

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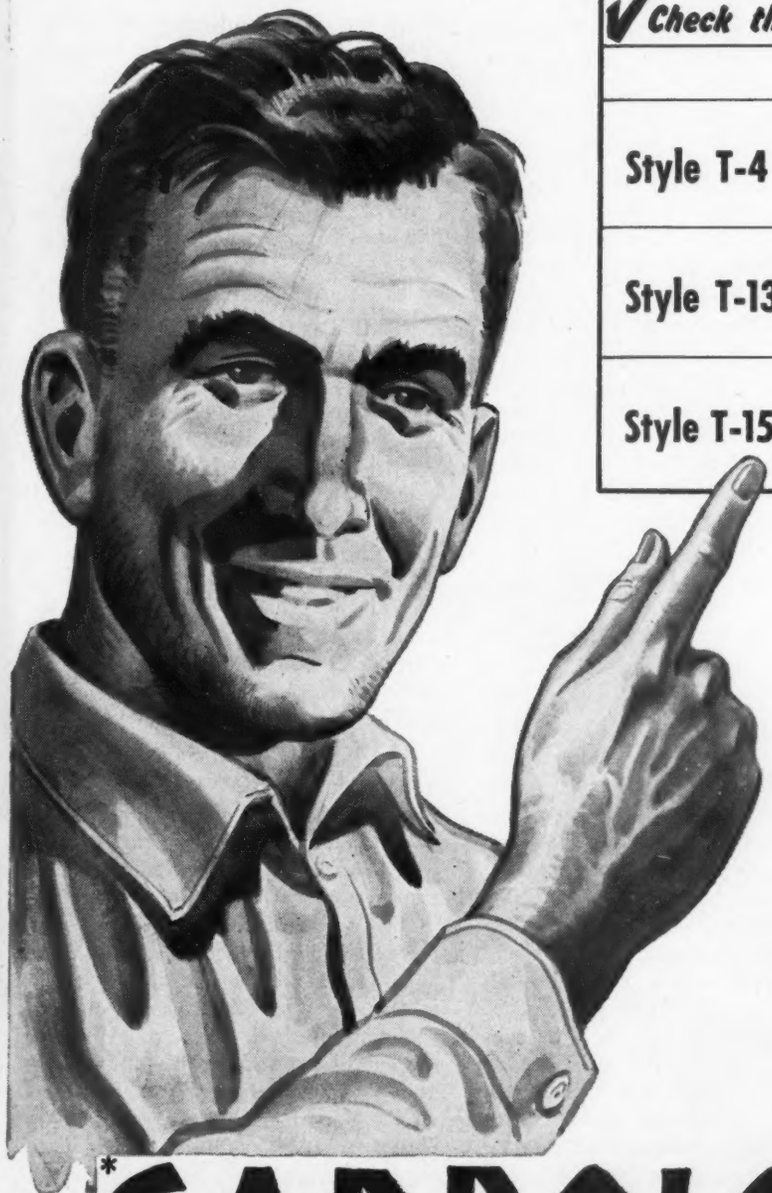

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Style T-4 5/16″ sq. Turning Tool	$ .84
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When you add up improvements like these:

—Big production-increases—excellent finish—extreme accuracy—the elimination of extra operations—and vastly increased tool life . . .

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Engineering News *at a Glance*

HANDLES MASSIVE PLATING: Widespread appearance of massive bumpers and grillwork on the postwar auto thrust new problems in the lap of the plating engineers. At Heil Process Equipment Corp., Cleveland, engineers developed a heavy duty anode particularly adaptable for fast plating heavy metal work. Taller and heavier than an average size man, its design includes special hooks for hoisting in and out of large plating tanks. According to the company, sawtooth design of the anodes also have better throwing power as well as several times the current-carrying capacity of standard units used previously.

X-RAYS PROBE MATERIALS: Possibility that samples of coal, tetraethyl lead in gasoline, and plastics may be analyzed by a new method of x-ray absorption—created from a wartime-developed test of fuzes for hand grenades—was revealed recently in Atlantic City, scene of the American Chemical Society meetings. The technique, described by Dr. Herman A. Liebhafsky of the General Electric research lab, Schenectady, N. Y., also has been used for certain ultimate analyses, such as determination of the amount of oxygen in compounds of carbon, hydrogen and oxygen. According to the doctor, amount of energy taken from an x-ray beam passing through a given mass of material is always the same, be the material hot or cold—gaseous, liquid or solid.

RADAR—POLICE AID: From Norwalk, Conn., Automatic Signal Division, Eastern Industries Inc., reports the development of radar equipment that can be used to determine the speed of cars on streets and highways, among many other industrial applications. According to the company, the instrument clocks cars at speeds of 0 to 100 mph with accuracy of within 2 mph. Its operating zone extends for about 150 ft in front of the transmitter-receiver unit. It also can be hooked up with a graphic recorder to provide permanent readings.

TEXTILE FINISH FOR METALS: New system of fiber spraying metal and other materials by means of a special cartridge-loaded fiber gun was among the latest developments shown at the first postwar British Industries Fair held during the early part of May in London and Birmingham. The process, used extensively in Britain for decorating interiors of public vehicles, automobiles and aircraft, provides a textile finish (in 16 colors) that is suede-like in texture, fadeless and condensation resisting. Color is added by application of an adhesive in the desired shade on the material being finished, just prior to spraying the surface with the powdered fiber—while the adhesive is still moist. Gun used in the process is capable of covering some 60 sq ft of surface with each loading.

BIG BRASS USER: Among the big bronze and brass users is the jewelry industry which consumes many pounds of the metal in making countless adornments for women. This year, manufacturers are expected to consume about 25,000,000 lb of copper, brass, bronze and nickel silver. According to the Copper & Brass Research Association, New York, copper and copper alloys are used by the industry largely in the form of sheet or strip and wire.

MAKES FLYING SAFER: Two important safety factors are embodied in the new tandem-type high pressure fuel pump developed recently by Pesco Products Division, Borg-Warner Corp., Cleveland, for use with turbo-jet engines and aircraft gas turbines. First, if the main engine pump should fail, Pesco's standby pump can supply enough fuel to operate the engine at full power. Second, the development, which is installed on the engine accessory drive gear box, eliminates about 30 lb in weight. The tandem pump primarily consists of two standard type fuel pumps combined with automatic changeover valves, all enclosed in one housing.

BETTER FUEL NOZZLE: Keith V. Smith of the Westinghouse Research lab recently perfected a fuel nozzle which may be a decided factor in speeding up development of the gas turbine for locomotive and marine use. Spraying a solid cone of heavy fog, it performs effectively below the drizzle point of the conventional mechanical atomizing unit. The new nozzle, it is revealed, enables a minimum of 96 per cent of the heat potential of fuel oil to be converted into energy. Key to its atomizing power is a very small flow of relatively low-pressure compressed air—less than 1 cfm—that enters through six tiny air ducts cut at an angle in the nozzle. As these separate streams of air enter the atomizer, their whirling motion sets up a miniature cyclone. This air blast collides with incoming fuel, splitting the heavy oil into droplets so fine that they approach the size of fog particles. The development is to be used in connection with a 2000-hp gas turbine generator set now under experimental development at the company's South Philadelphia Works.

TIRES—ADDED INCENTIVE: Use of pneumatic tires is a great factor in the widespread adoption of the 2000-lb fork lift truck in industry, according to the results of a survey conducted by Hyster Co., Portland, in all of the 20 basic classifications of manufacturing industries established by the Department of Commerce. Popularity of rubber-tire equipped trucks is due to the fact they allow greater operating speeds, and permit operation over slippery and rough surfaces and on steep grades both inside and outside plant buildings. According to the survey, these trucks provide an average saving of 66½ cents per ton over previous handling methods, including both heavy and light materials. Most of the savings are derived from freight-car loading and unloading operations.

SIMPLIFIES JOB: In Detroit, it was learned, the nib type taps coupled to hollow shanks produced by Detroit Tap & Tool Co. are particularly useful in tapping pipe couplings where fairly long shank taps are normally used, tapping through several parts at one time and allowing the tapped parts to load up on the long shank. Thirty per cent lighter, the shanks are manufactured from steel tubing with an internally broached spline. They also include a knurled portion on the outside diameter to assist the operator with oily hands in removing the tap from the chuck quickly.

ADJUSTS TO ANY SPEED: An improved power transmission, invented by Joseph E. Anderson, an engineer, in which input and output shafts are permanently gear connected is constructed so that speed of the output shaft may be reversed in direction of rotation without shifting gears or frictionally transmitting the power from the input shaft to the output shaft. According to Charles M. Zust, New York, which recently acquired manufacturing and sales franchises on the development, the output torque of the transmission, called the Constantorque variable speed reducer, is at all times equal to the input torque at all speed ratios whether in forward or reverse direction. The unit operates on the principle of dissipating such revolutions not required on the output shaft.

announcing a basically new idea in resistance welding . . . . .

SYNCHRO-TROL Packaged Controls

You'll profit many ways from this newest Westinghouse first in resistance welding . . . Synchro-Trol controls that come to you as a factory-tested, factory-assembled, compact, packaged unit.

It simplifies your operation because it brings all controls together in one cabinet. You get swift, easy settings and tamperproof protection. It simplifies installation, for it eliminates multiple connections, awkward sizes and complicated mountings. You can save up to 50% in floor space. And it simplifies buying, since you select only the units you need.

You can choose from eight basic subunits and five auxiliary subunits to build up your Synchro-Trol (see panel), plus a blank panel to house any small controls required for your special process. Get the facts today from your nearest Westinghouse office on the ways Synchro-Trol can bring new flexibility to your resistance welding operations. Or write Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y. J-21418

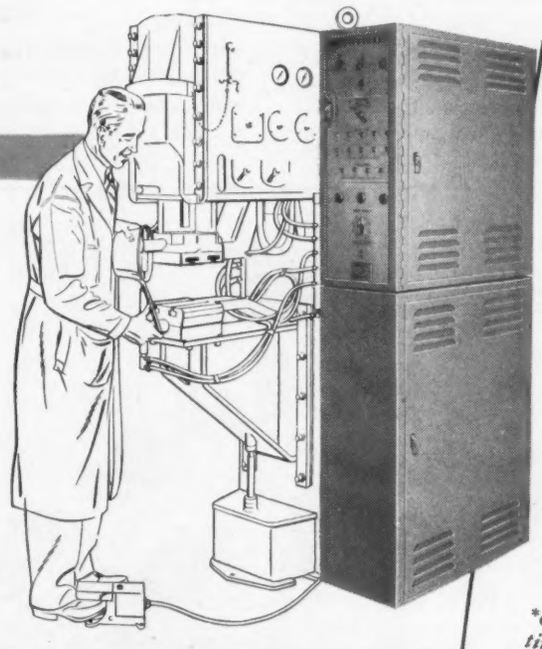

Illustration shows one type of arrangement for resistance welding. Panels can be substituted quickly and easily to employ other functions.

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add one of the following*

- Weld Timer
- Pulsation Weld Timer
- Electronic Seam Timer

and one of these*

- 7B Sequence
- 9B Sequence
- Blank Panel

and one of these (if you want it)

- Blank Panel
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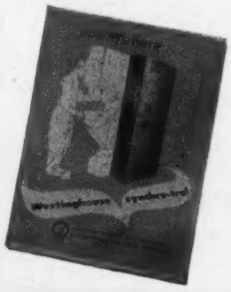
- Current Regulator
- Forge Timer

or you can use an electro-mechanical seam timer or temper sequence.



Get the full story in this new book that tells you how to form combinations of the subunits and gain the special advantages they offer. Ask for booklet B-3839.

Westinghouse
Synchro-Trol
Electronics at Work

In functioning as a clutch to protect a motor under overload conditions, the unit can be arranged with an auxiliary solenoid overload release.

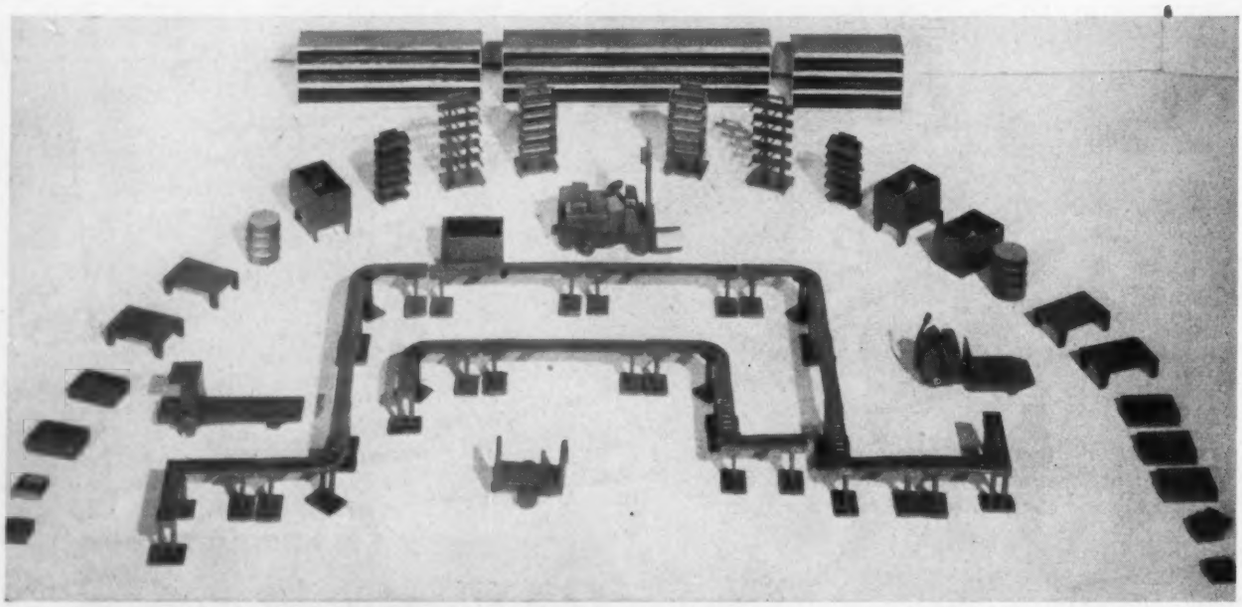
GAS-FILLED MOTORS: Two special 300-hp, 240-rpm inert-gas-filled synchronous motors now being built by General Electric Co., Schenectady, N. Y., for use in an inflammable atmosphere incorporate all necessary features into one simple, smooth design. The gas is under sufficient pressure so that any leakage will be outward and no air or inflammable gas will get into the motor. Besides sealed chambers which contain the noncombustible gas, the motors also feature built-in coolers.

PHASE MICROSCOPY: Many microscopic materials are so transparent that their details differ from the background in either refractive index or actual thickness, resulting in a difference in light path too small to be seen by conventional microscopic methods. A new development—phase microscopy—developed by scientists of American Optical Co., renders such details visible with sufficient resolving power for identification. Besides the standard microscope, the instrument makes use of an annular diaphragm in connection with the substage condenser, illuminating the specimen with a hollow cone of light. A special diffraction plate is inserted within the microscope objective. Depending on kind of diffraction plate used, regions within the specimen of different optical paths can be made bright on a dark background or dark on a light background. Invisible phase differences of light are converted into illumination differences to which the eye is sensitive.

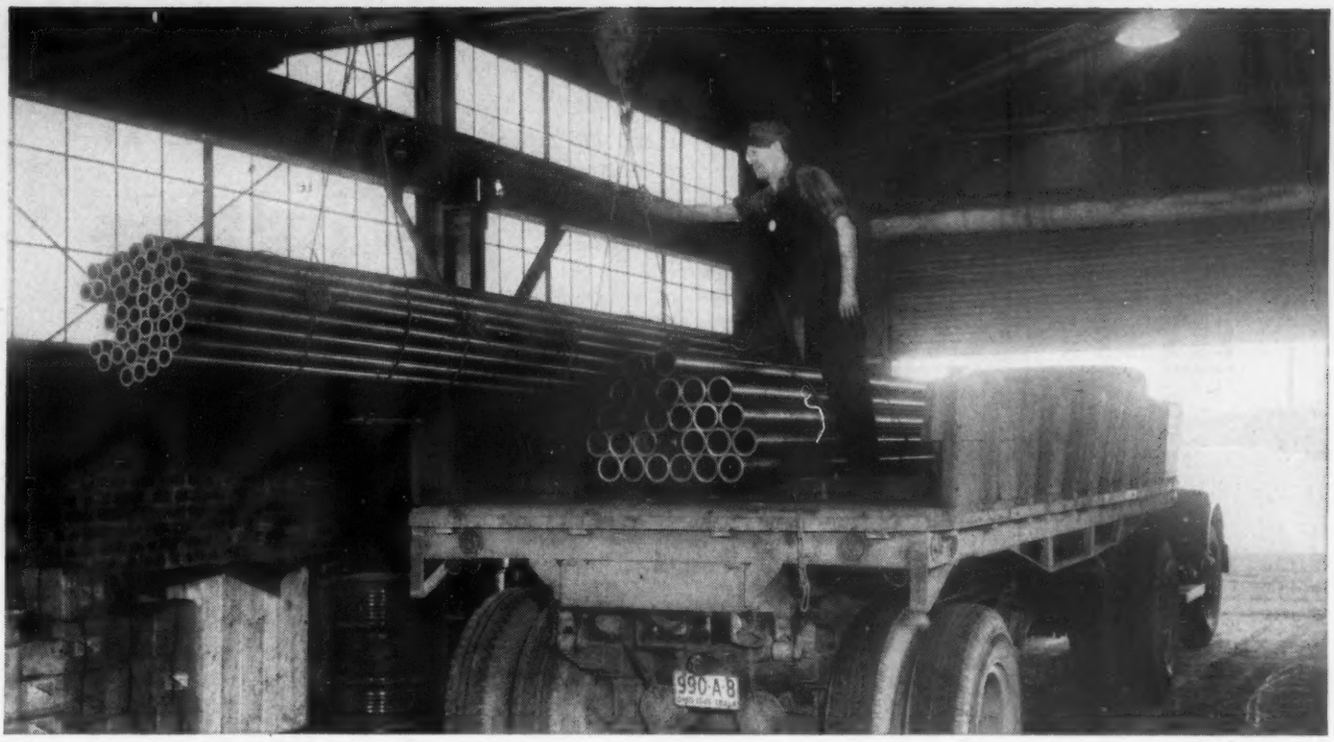
MECHANICAL "GENIUS": Solutions to complex supersonic aerodynamic problems are produced in one-sixteenth the time required by trained mathematicians by one of the latest computing devices, a new electric calculator now at work for the National Advisory Committee for Aeronautics. Built by Bell Telephone Laboratories, the development solves difficult transonic aerodynamic equations containing as many as 36 unknown terms or variable coefficients without error. Built-in check circuits prevent the calculating process from continuing on a problem if each step is not correct or fully completed. Even while computing unattended the machine will drop calculations in which an error is found and proceed to another portion of the problem which is unaffected by the error; or to an entirely new problem automatically.

PRODUCES LOW-COST TOOLS: Reduction of the cost and time consumed in the manufacture of tools can now be achieved, and more serviceable and generally improved tools produced through use of low pressure laminating techniques, according to Lawrence Wittman, tool development engineer, Republic Aviation Corp. Stating that the saving of over $100,000 in tooling costs, on applicable tooling, during its first full year's use at Republic is ample evidence of the economy of this tooling system. He pointed out that laminate tooling is applicable to a wide range of tool types wherever contours or odd shapes need to be maintained. The inherent accuracy, low bulk and light weight of laminated tools, combined with versatile methods employed in their manufacture, makes the system adaptable to not only the aircraft, but also auto, bus, truck, boat and sheet metal products industries.

COMPARES WHILE AT WORK: Several German developments caught the attention of visitors at the Frankford Arsenal exhibit recently—sponsored jointly by the Office of Technical Services, Office of the Chief of Ordnance (Army) and the National Machine Tool Builders' Association. One of them, a precision grinder uses a novel optical system that enables the operator to compare his work with the engineer's drawing as the work proceeds. The machine is used for making templates, cylindrical forms and other complicated shapes. Other machines that attracted attention were a jig borer which drills jigs to the extremely close tolerance of 1/400,000th of inch, and an ultramicrometer which measures radial tolerances to a precision of 0.4 to 10.0 microns.



PLANNING MODELS: To help engineers in crystallizing new ideas for improving production and manufacturing methods, Visual Production Planning Inc., Pittsburgh, currently is turning out a complete line of materials-handling equipment—built to ¼-in. scale. As shown in the accompanying illustration, the tiny models consist of various types of belt and roller conveyors, rack conveyors, transport, motorized and hand trucks, shelving, bins, tote boxes of all sizes, as well as skids and skid boxes in most standard dimensions. Production of the miniatures was instigated by a demand for such models to be used in conjunction with its 3-dimensional template-base machine tool models



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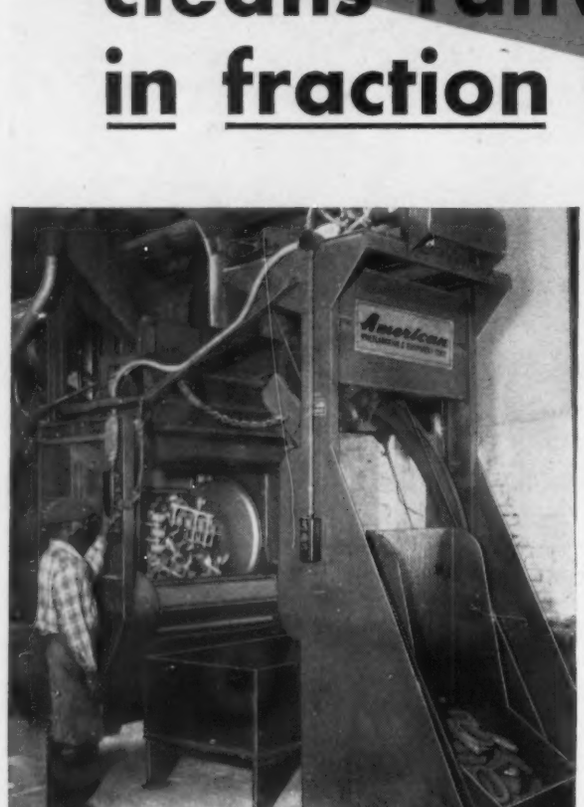
AIRLESS WHEELABRATOR cleans railway specialties in fraction of former time



This 36" x 42" Wheelabrator Tumblast cleaned a quantity of steel locomotive castings in 57 minutes that formerly required 19 hours by airblasting at the Balmar Corp., Baltimore.

The speed cleaning of the airless Wheelabrator is playing a vital role in helping to solve the present critical railway car shortage. Its faster more thorough cleaning of all sizes and shapes of castings saves many hours daily in the production of these much needed parts.

for example

• At the General Railway Switch Co., Rochester, N. Y., a 36" x 42" Wheelabrator Tumblast is cleaning the same amount of work in sixteen hours that formerly took 24 hours on 2 airblast tables. This work includes steel castings, cable pulleys, signal mounts, etc.

• 1500 pound loads of annealed castings are being cleaned in from 10 to 12 minutes by a 48" x 72" Wheelabrator Tumblast installed in the Harrison Foundry, Attica, Indiana. Here, the Wheelabrator is cleaning work in 8 hours that took 24 hours to clean by the previous method.

• A Wheelabrator Tumblast, installed at the Canadian Bronze Co., Ltd., Montreal, Canada cleans seventy-five 5" x 9" journal bearings, weighing 18 lbs. each, in 4 minutes. Former methods took 30 minutes to clean the same amount of work.

TYPICAL USERS

New York Air Brake Co.
Pratt & Letchworth Co.
American Steel Castings Co.
American Locomotive Co.
Unitcast Corp.
American Brake Shoe Co.
The Griffin Wheel Co.
Pullman Standard Car Mfg. Co.
Canadian Car & Foundry Co., Ltd.
The Locomotive Finished Material Co.
American Car & Foundry Co.
Magnus Metal Division
Timken Roller Bearing Co.
The Baldwin Locomotive Works
Union Switch & Signal Co.
Westinghouse Air Brake Co.
General Railway Switch Co.
Norfolk & Western Railway Co.
Electric Steel Castings Co.
Falk Corp.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
509 S. Byrkit St., Mishawaka, Indiana

World's Largest Builders of Airless Blast Equipment

Annealing Salt

(*Continued from Page* 87)

essary annealing and flux removal. These steps require 59 min for the process alone without including handling time. Also, several of these steps are relatively expensive to maintain. In the search for better methods of mass-producing exhaust manifold equipment at reduced costs, the research department began a series of experiments. Result of these experiments produced a new and completely successful method for annealing 18-8 stainless steel and the removal of welding flux. This process is faster and more economical than the former method. Patent applications on this innovation have been made by the Ryan Aeronautical Co. from whom specific details may be obtained.

Early in the course of investigations it was decided that the simplest and most economical method for meeting the requirements would be by the use of molten salt bath, for annealing, followed by a cold pickle acid bath. Such a salt must have several important characteristics: (1) It must have a viscosity at operating temperature which is low enough to permit low drag out to save time and cost. (2) It must react with the flux, to dissolve it. (3) It must provide a uniform oxide scale of a type easily removed by pickling. (4) It must have a low enough melting point and a degree of stability which will permit it to be safe for employees and the parts to be processed.

Several salt mixtures have been on the market for heat treatment of carbon steels. One of these salts, pure barium chloride, was recommended as being capable of operating at required temperatures without appreciable decomposition. Since the parts are of stainless steel, with high corrosion resistance, the process of rectification was unnecessary.

An electrically heated salt bath, the furnace of which consists of a well insulated tank lined with tile, was used. Metal electrodes immersed in the salt conducted the low voltage alternating current that was used to heat the bath. The furnace was designed to operate at temperatures ranging from 1950° to 1980° F. When the furnace was first operated, it immediately became apparent that pure barium chloride has many disadvantages for use with stainless steel. It decomposes quite appreciably at 1950° F. As a matter of fact, damaging quantities of chlorine gas were liberated by the bath for the first 3 or 4 weeks it was in operation. After this length of time the unrectified bath proceeded to dissolve material at the grain boundaries of the cast electrodes which were originally provided with the installation. At the end of 26 days, the first set of them failed completely. Another set was installed and it too succumbed to the corrosive action of the unrectified salt within a few days. At this time the furnace was shut down and a series of experiments were conducted with various metals to get a suitable electrode material.

Wrought Bars of Inconel

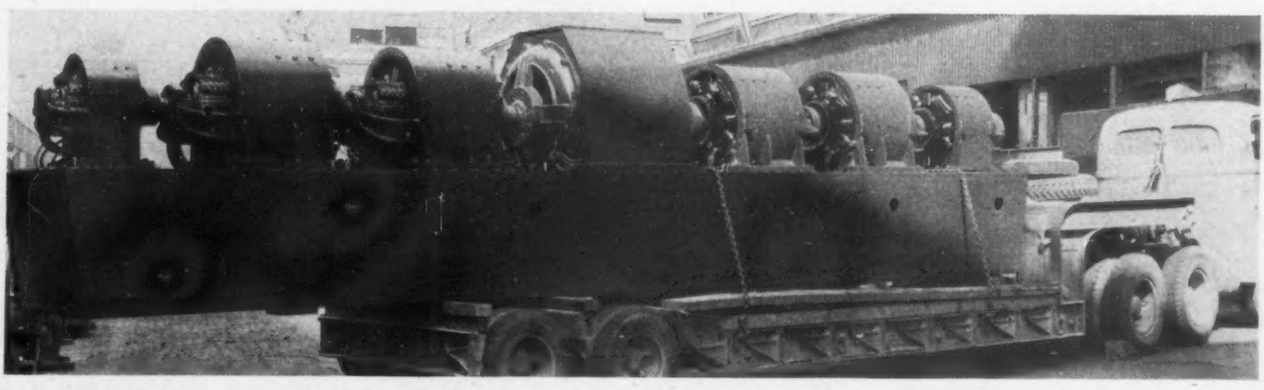
Finally, a set of 3-in. round forged bars of Inconel were welded on to the arms of the electrodes in place of the cast stubs. These wrought bars have been in use for a good many months now and show no signs of wear. A metallographic examination showed that the salt had penetrated the surface approximately 0.003-in. It was felt that if this metal could be removed the parts would be suitable for use. In order to effect this removal the parts were scaled at 1980° F and pickled, but the problem was not solved. After a few weeks every tiny pore, crack and scratch became a tiny rust spot. It was then decided to learn whether any salt was available for use as a heat treating medium for 18-8 stainless.

Several commercial producers of heat treating salts were contacted and samples of their salts operating between 1650° and 2000° F were obtained. Each was heated to a temperature of 1750° F in either an Inconel or stainless steel pot by means of a circular gas fired furnace. Samples of stainless steel were then immersed in the salts for varying lengths of time and either quenched in water or allowed to cool in air. In order to determine whether or not pickling was absolutely necessary, some samples were pickled and other samples were not.

General properties of each salt such as fuming tendencies, mobility, sludge formation and so on were observed. Stainless steel samples were sectioned and examined metallographically to determine the extent of attack if any. Salts which were tested were all either pure barium chloride or barium chloride with other compounds added.

When first heated, pure barium chloride liberates chlorine gas as mentioned before. It makes no difference whether it is heated electrically or by gas. No considerable amount of sludge is formed if the salt is not rectified. During the first few hours of operation, the salt comes off quite easily on quenching in water, but by the second day it becomes very tenacious and extremely difficult to remove. Parts treated in this medium will rust badly if every trace of salt is not removed within a very short time after treatment. At first intergranular attack on the steel is relatively small, but as the bath becomes contaminated with the oxide of barium, the intergranular attack increases markedly.

After the bath had run for 24 hours without rectification, sodium chloride was added in rather large amounts. A great amount of white, acrid smoke, apparently sodium oxide, was evolved. After this treatment an attempt was made to maintain a rectified condition with a commercial rectifier. A large amount of



DELICATE LOAD: In order to maintain a critical lineup of 0.001-in. at the shaft, this 65,000-lb, 7-unit alternating to direct current motor-generator set had to be shipped assembled from General Electric Co.'s Fort Wayne, Ind., works. To be used with a large dragline excavator, the 33 ft long set has a selfsupporting base 36 in. deep and an overall height of about 7 ft. It consists of one synchronous motor, 2 hoist direct current generators, 2 drag direct current generators, one swing direct current generator and one thermal magnetic shunt direct current exciter

hard sludge was formed, and from all indications the bath was finally rectified.

Salts A and B may be considered simultaneously because they are so similar. They appeared to be composed of barium chloride to which had been added sodium and potassium chlorides. They both fumed rather badly, but presented a clear surface and produced little sludge. Neither salt was rectified during the tests. The same effect was shown here that appeared with pure barium chloride, namely, after operating for a while the salt becomes hard to remove. This stage took longer to reach in the cases of these salts than with pure barium chloride. Each of them quenched rather quietly and gave a dull brown to black surface on the metal which was easily removed by pickling. Again, pickling was shown to be insufficient for complete salt removal. Parts rusted over night in areas contaminated by the salt. The flux-removing properties of the salts were rather poor. Intergranular corrosion was not excessive until after the bath had been operated for a relatively long time without rectification.

Salts C and D may be considered together, also, because of their similarity. They both have the property of being constantly rectified by a blanket of powdered carbon and silicon carbide over the entire surface of the bath. The carbon serves as a neutral insulator between the barium chloride and air while the silicon chloride reacts with any barium oxide that is formed. The rectifier is added to the bath as a fine powder which floats on the surface. As the silicon carbide is used up a hard sludge is formed, some of which goes to the bottom while the remainder is supported by the film of floating carbon and unreacted silicon carbide. This sludge and the presence of the film on the surface made the use of this salt undesirable when another was found which would do the same job without these disadvantages.

Neutral Salts C and D Recommended

At operations which take place over 1700° F or where a neutral salt is required, salts C and D would be highly recommended. They were far superior to the other commercial salts tested. One of them is designed for the heat treatment of ordinary alloy steels and the other for the heat treatment of a high chrome alloy. Difference in their behavior toward 18-8 stainless steel is quite noticeable; in 5 min, one of them will produce a layer of heavily corroded material about 0.003-in. deep. Unlike the similar layer produced by pure barium chloride, this one pickles off almost completely. The other salt does not contribute greatly to intergranular attack.

These salts reacted violently when quenched in water. They crackled loudly and spattered hot salt and water over a wide area. This condition may be caused by the blanket material which sticks to the parts as they are pulled through it upon being removed from the pot. Also, unlike the other salts in their quenching action, the surface of the metal was bright and practically free of all salt. If the parts are cooled in air it becomes a simple matter to remove the salt. Both of these salts removed most of the welding flux from the samples, but in no instance was this removal complete.

Pure sodium carbonate is the one salt which was tested as a heat treating medium for 18-8 stainless steel which emerged as a completely satisfactory product. It is practically an ideal salt because it needs no rectification. Baths which have been operated continuously for a month show no signs of giving trouble. The salt is easily removed from the parts by acid and the light scale formed by 5 min immersion can be removed by a cold pickle which has been developed by research. This makes the entire problem of heat treating welded sections very simple, since all silica base materials are very soluble in sodium carbonate welding fluxes are easily removed in the bath. This makes it possible to complete the heat treating cycle merely by a 5 min immersion in the molten sodium carbonate followed by a cold water quench.

Parts are then placed in dilute sulphuric acid to remove the salt, rinsed and placed in the cold pickle for 5 min. After this treatment the parts are free of all salt and flux and possess a very bright finish. Test bars, which were strain hardened by stretching them to 75 per cent of their total possible elongation, will give an additional 35 per cent elongation by this 5 min treatment at 1650° F. Fifteen minutes in an air furnace at 1980° F will produce an additional 40-45 per cent elongation on similar test bars.

Up to about 1700° F there is no fuming, but at 1725° F it is noticeable and at 1750° F it becomes excessive. Since the bath needs no rectification, it produces little or no sludge other than the contaminants introduced by the parts themselves. It always presents a clean surface and quenches very quietly. Due to its mobility there is very little drag out and the salt that does stick to the parts is easily removed. Cost of the salt itself is far below that of usual commercial heat treating salts. From the standpoint of ease of operation, safety and cost, pure sodium carbonate is by far the best heat treating medium for 18-8 stainless steel that has been tested in the Ryan experimental laboratory. The results given in the accompanying table may help to compare the properties of the various salts. Each one is rated, A, B, C or D according to our opinion of the desirability of its behavior in large scale production where it is necessary to heat treat 18-8 stainless steel parts for short periods.

In view of the fact that all of the commercial salts which were tested were essentially barium chlorides with minor additions, it may be interesting to discuss what actually occurs in a barium chloride bath operating at high

NEW LITERATURE

MULTI-RANGE ARC WELDER
By Hobart Brothers Co., Box DM-738, Troy, O. Bulletin illustrates and gives applications and features of the multi-range arc welder with dual control and remote control.

HYDRAULIC OVERLOAD PITMAN
By Dayton Rogers Mfg. Co., 2835 Twelfth avenue south, Minneapolis 7, Minn. Four-page bulletin gives information on specifications, operation and dimensions required for installation of the hydraulic overload pitman.

ORGANIC CHEMICAL INTERMEDIATES
By B. F. Goodrich Chemical Co., 324 Rose building, Cleveland 15. Technical bulletins describe Good-rite Rhodanine and Good-rite 2-Aminoethyl sulphuric acid.

SIMPLEX UTIL-A-TOOL
By Templeton, Kenly & Co., Cicero, Ill. Bulletin describes in detail various industrial plant uses of the Util-A-Tool. Specification charts and price lists are also included.

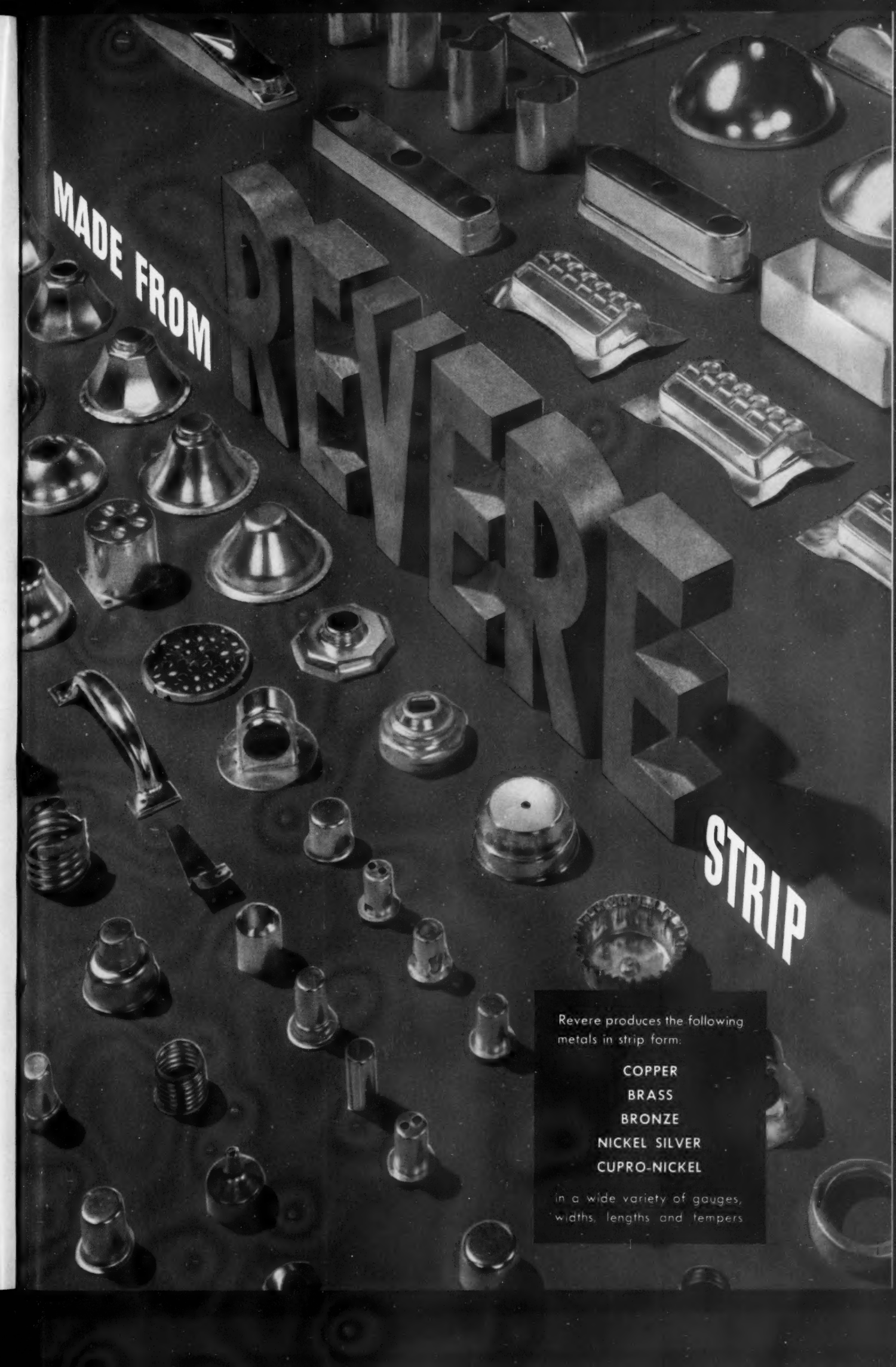
POWDER METALLURGY
By Keystone Carbon Co. Inc., St. Marys, Pa. A 44-page illustrated booklet in two sections. The first section covers powdered metal parts—their applications, design styles and specifications. Second section on powdered metal bearings describes and illustrates installation of Selflube bearings. Bearing sizes and code numbers are included.

NONFERROUS METALS AND ALLOYS
By Federated Metals Division of American Smelting and Refining Co., Pittsburgh. Bulletin describes a few of the nonferrous alloys manufactured by the company, such as aluminum alloys, babbitt metal bearing alloys, copper alloys, lead alloys, etc.

MILLING MACHINE
By Van Norman Co., Springfield 7, Mass. Bulletin gives concise and complete information on No. 2 heavy horizontal milling machine. Specifications include information on both plain and universal models.

CYCLING PLANT
By Fluor Corp. Ltd., 2500 South Atlantic boulevard, Los Angeles 22. A colorful 32-page booklet illustrating and describing the South Coles Levee cycling plant which the company designed and constructed.

POWER DRIVE CIRCLE ESS FLEXIBLE SHAFTING
By F. W. Stewart Mfg. Corp., 4311 Ravenswood avenue, Chicago 13. Four-page bulletin describes and illustrates various types of flexible shafts available and gives the list price.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STRIPS and ROLLS for fast, economical fabrication

Revere Metals in strip and roll form are widely used through industry for the manufacture of parts and products by such processes as deep drawing, stamping, punching, spinning, embossing, rolling, etching, soldering, polishing, plating.

Special finishes, such as embossed, polished, etc., are available for some alloys and forms. Naturally, the value of such finishes depends upon two main factors: the fabrication processes through which the metal is put in your plant, and the nature of the articles or parts you make. Where suitable, special finishes often reduce costs and improve the beauty, attractiveness or service of the finished product.

BRASS

Probably most manufacturers when they think of non-ferrous strip think of brass, because it is an old and honored metal, corrosion-resistant, and adaptable to a wide range of fabrication conditions, from simple stamping to exceptionally deep drawing, as in cartridge cases. Yet it should be remembered that *brass is not just brass.* There are many different brasses which vary in their composition. In addition, each brass alloy can be had in a variety of physical conditions. By rigid control of processing in the Revere Mills, strict specifications as to temper, hardness, and grain size are met.

COPPER — BRONZE
NICKEL SILVER — CUPRO-NICKEL

But in addition to brass strip, Revere also produces strip in copper, bronze, nickel silver, and cupro-nickel. As is the case with brass, each of these is available in a range of compositions and physical characteristics.

GENERAL CONSIDERATIONS

The importance of a careful study of both composition and physical properties cannot be stressed too often, particularly at this time, when certain war developments in the metal industry should be taken into account. It might be, for example, that a difference in alloy, temper, gauge or dimensions would make manufacturing economies possible by increasing the number of draws between anneals.

Worthy of consideration when specifying strip is the question of gauge and width. It is sometimes the case that a reduction in the cost of the material can be achieved by slight changes in gauge and width. To this saving may be added an additional one—reduction in amount of scrap. Though scrap from strip has a high re-sale value, it costs money to segregate and bale it, and any reduction in its amount represents a saving.

Strip is an exceptionally useful form of metal. Revere will gladly cooperate with you in studying the important subject of specification.

On this page you will find technical data on only a few of the Revere Metals produced in strip and other forms as well. If you require further information, get in touch with any Revere Office or distributor.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.

COMMERCIAL BRONZE, 90%

Alloy no. 120 • (copper 90.0%, zinc 10.0%)

Forms available: sheet, strip, plate, rod, tube, forgings.

General Properties: Revere Commercial Bronze, 90%, has high ductility. Compared to copper, it has higher tensile strength but lower thermal properties.

Typical uses: Commercial Bronze, 90%, is used for costume jewelry, compacts and lipstick cases. Also recommended for forgings, screws, weather stripping and standard hardware.

Working Properties: Cold-working, soldering, polishing — excellent. Hot-working — excellent. Machining—poor. Welding—gas, carbon arc, metal arc.

ASTM specifications: Sheet: B36, B130. Rod: B134

RED-BRASS, 85%

(Rich Low Brass) • Alloy no. 130 • (copper 85.0%, zinc 15.0%)

Forms available: sheet, strip, plate, rod, wire, tube, pipe and lockseam tubing.

General Properties: Revere Red-Brass, 85%, has higher strength and greater ductility than copper, and its excellent corrosion resistance often exceeds that of copper, as in salt water.

Typical uses: Red-Brass, 85%, is recommended for jewelry, name plates, badges, tags, dials, hardware, etched parts. For tubing and pipe for oil and utility fields and plumbing. Also for automobile radiators, bellows and flexible tubing.

Working Properties: Cold-working, soldering, polishing — excellent. Hot-working — good. Machining—fair. Welding—gas, carbon arc, metal arc, spot and seam welding for thin gauge.

ASTM specifications: Sheet: B36, B111, B135. Rod: B134. Tube: B43.

SEVENTY-THIRTY BRASS

(Cartridge Brass) • Alloy no. 160 • (copper 70.0%, zinc 30.0%)

Forms available: sheet, strip, tube, rod, rectangular bar and lockseam tubing.

General Properties: Revere Seventy-Thirty Brass has the best combination of ductility and strength of all the brasses and accordingly has superior cold-working properties.

Typical uses: Seventy-Thirty Brass is recommended for cartridge cases, ammunition components and for any difficult deep drawing, stamping or spinning job.

Working Properties: Cold-working, soldering, polishing — excellent. Hot-working — good. Machining—fair. Welding—gas, carbon arc, metal arc, spot and seam welding for thin gauge.

ASTM specifications: Sheet: B19, B36. Tube: B135. Rod: B134.

YELLOW BRASS

Alloy no. 170 • (copper 66.0%, zinc 34.0%)

Forms available: sheet, strip, rod, wire, and lockseam tubing.

General Properties: Revere Yellow Brass possesses excellent cold-working properties with good corrosion resistance. Mechanical properties and corrosion resistance are similar to those of alloys no. 160 and no. 165.

Typical uses: Yellow Brass is recommended for pins, rivets, eyelets, auto radiator cores, heating units, lamp bodies and reflectors, electrical sockets, and drawn shapes. Also for deep drawing, stamping, spinning, etching and rolling for practically all fabricating processes.

Working Properties: Cold-working, soldering, polishing—excellent. Machining—fair. Welding—gas, carbon arc, metal arc, spot and seam welding for thin gauge.

ASTM specifications: Sheet: B36.

PHOSPHOR BRONZE, 5% (A)

Alloy no. 308 • (copper 95.0%, phosphorus 0.05%, tin 5.0%)

Forms available: sheet, strip, rod.

General Properties: Revere Phosphor Bronze, grade A, possesses high tensile strength, high resistance to corrosion and fatigue and has a low friction coefficient. It is also highly resistant to season cracking.

Typical uses: Revere Phosphor Bronze, grade A, is used for springs, diaphragms, bellows, lock washers, cotter pins, fuse clips, clutch discs, screw machine stock, perforated sheets, etc.

Working Properties: Cold-working, soldering, polishing — excellent. Hot-working — poor. Machining—fair. Welding—gas, carbon arc, metal arc, spot and seam welding for thin gauge.

ASTM specifications: Sheet: B100, B103. Rod: B139.

NICKEL SILVER, 18% (A)

Alloy no. 533 • (copper 65.5%, nickel 18.0%, zinc 16.5%)

Forms available: sheet, strip, lockseam tubing.

General Properties: Revere Nickel Silver has high resistance to corrosion and tarnish. It is also malleable and ductile.

Typical uses: Nickel Silver is recommended for marine and automotive trim, hardware, architectural panels and extruded shapes, lighting, electrical and plumbing fixtures, various equipment of the process industries, tableware, jewelry, stamping and etching.

Working Properties: Cold-working, soldering, polishing—excellent. Hot-working, machining—fair. Welding—gas, carbon arc, metal arc, spot and seam welding for thin gauge.

ASTM specifications: Sheet: B122. Rod: B151.

NICKEL SILVER, 18% (B)

Alloy no. 555 • (copper 55.0%, nickel 18.0%, zinc 27.0%)

Forms available: strip, lockseam tubing.

General Properties: Revere Nickel Silver (spring stock) possesses high physical properties, high resistance to corrosion and tarnish and high fatigue strength.

Typical uses: Nickel Silver (spring stock) is recommended especially for springs, also for marine and automotive trim, hardware, architectural panels and extruded shapes, lighting, electrical and plumbing fixtures, various equipment of the process industries, tableware, jewelry, stamping and etching.

Working Properties: Cold-working, soldering, polishing—excellent. Hot-working, machining—fair. Welding—gas, carbon arc, metal arc, spot and seam welding for thin gauge.

ASTM specifications: Sheet: B122.

HERCULOY

(Silicon Bronze)

Alloy	Copper	Silicon	Manganese
420	96.0%	3.0%	1.0%
421	98.00%	1.75%	0.25%

Forms available: sheet, strip, plate, rod, wire, tube, forgings.

General Properties: Herculoy has excellent mechanical properties. The strength of Herculoy is comparable to that of low and medium carbon steel. Its resistance to corrosion is similar to that of copper. These alloys are non-magnetic and gold colored.

Typical uses: Herculoy is recommended for tanks, pressure vessels (unfired pressure vessels codes), vats, baskets, hardware, bolts, screws, lag screws, cotter pins, washers, turnbuckles, marine construction, shafting, plates, screens, filters, ducts, weatherstrips, springs, forgings, electrical conduit.

Working Properties: Cold-working, soldering—excellent. Hot-working—good. Machining, polishing—fair. Welding—gas, carbon arc, metal arc, spot and seam welding for narrow gauge.

ASTM specifications: Sheet: B96, B97, B100. Rod: B98, B124.

Nothing pleases Revere more than to be able to sit down with a customer and discuss fabrication methods and end uses. Such friendly collaboration often has resulted in increased production, lower costs, an improved product, or all three. In one case, substitution of leaded brass for high brass was suggested, for greater ease in blanking and to reduce the need for dressing down with a file after assembly. In another, a slight change in gauge reduced material cost. In still another, a different temper eliminated one anneal. The Revere Technical Advisory Service is at your command.

temperatures. Although barium chloride has one of the highest decomposition points of inorganic salts it does decompose at extreme temperatures. The decomposition apparently is an equilibrium reaction. As fresh salt is heated, a liberation of chlorine occurs which gradually ceases, leaving a good deal of chloride in the bath. This indicates that the conversion to oxide is not complete. The effect of this oxide-chloride mixture on stainless steel is very noticeable. The rate of attack is greatly accelerated and the salt becomes very difficult to remove. Parts which have been treated in this mixture rust badly and if left in the solution for a few hours, embrittlement occurs.

In the course of our tests of barium chloride at the Ryan laboratory, it was learned that two distinct layers were present in the bath. The top one, about 8 in. deep, was extremely corrosive—a piece of 0.031-in. stainless steel would become completely embrittled in 4 hours; the lower layer had about one fourth this effect. Due to the complexity of the mixture it was not possible to determine the exact composition of the layers.

Because of the fact that the corrosive action is caused after the salt has partially decomposed to the oxide, it would be logical to assume that if this reaction could be prevented, the salt would behave as normally expected. This assumption is borne out by experiment. Two methods of preventing the reaction are: To exclude oxygen so that no oxide could be formed or, add a substance which would remove the oxide as rapidly as it is formed. Normally, chloride baths contain the chlorides of sodium, potassium and barium in such proportions that a ternary eutectic is formed. This produces a rather stable, low melting point salt which is quite mobile at operating temperature. These baths are usually rectified at least once every 8 hours. No authority states what happens if the bath is not rectified, but the effect has been quite forcefully called to our attention when 18-8 stainless steel has been treated in an unrectified bath.

When one of these baths has been in operation for a long period and fails to respond to rectification, it is customary to add sodium chloride to it. This has a very beneficial effect. The barium oxide in the bath combines with the added sodium chloride forming barium chloride and the more volatile sodium oxide proceeds to distill out of the bath leaving it approximately free of oxides. Because most successful chloride salt mixtures contain sodium and potassium as well as barium, the most volatile oxide, either sodium or potassium will leave the bath as fumes as the chlorine is liberated. This will proceed until all of the sodium or potassium has been "boiled" out and then the bath will not respond to rectification and will become corrosive.

Therefore, efficient operation of a chloride bath requires that frequent or constant rectification be made. None of the barium chloride salts which were tested fulfill the requirement that the bath shall treat parts in 15 min or less with a minimum of attention and expense. Also, all of the parts treated in a barium cnloride base salt, even in those producing a bright quench, require an acid cleaning operation to remove all traces of salt and scale or they will rust badly on standing in the air for a few days. Pure sodium carbonate, on the other hand, will act as a safe treating medium without rectification or any of these other disadvantages.

Development of this ideal salt has reduced the number of steps enumerated in the annealing and flux removing processes from the 4 previously mentioned to only 2 while the time required for the procedure has been cut from 59 to 15 min. This saving of approximately 75 per cent of the time has permitted the manufacture of exhaust manifold equipment at the Ryan Aeronautical Co. in greater volume. At the same time this increased expansion has been accomplished at a saving in costs of about $100,000 per year in the expenditure required for the performance of the process.

New Motor

(*Concluded from Page 92*)

eliminating the base entirely.

The new motor can be readily inspected, cleaned and lubricated by simply removing its cover. It is unique in that it can be operated with the enclosing casting entirely removed. In textile motors where lint often clogs even the most open ventilating passages, this feature is of interest to maintenance personnel.

The WR^2 or flywheel effect of the motor is approximately three times that of corresponding conventional motors. This is of particular advantage in such applications as punch presses, oil well pumping units, etc., where the added flywheel effect reduces the amplitude of the peak electrical load on the motor. It is, of course, a decided disadvantage on applications involving repeated plugging and reversing where small diameter rotors are essential. The motor should not be used on applications of latter type.

There is a magnetic pull between the rotor and stator of the axial air gap motor which is taken care of by a double row fixed thrust bearing in the stator end of the motor. The rotating magnetic field produced by a distributed polyphase winding has essentially a sinusoidal space distribution. The flux density in the gap can be accurately calculated from winding data and core dimensions. The total magnetic pull can, therefore, be determined by the formula $P = B^2$ over 144×10^6 where P is pounds per square inch and B is flux density in lines per square inch. The average thrust of the motor is approximately 9 to 10 lb per square inch of gap area. Thrust bearings are selected to provide a factor of safety of seven or over so that this thrust load becomes a minor factor insofar as the wear or life of the bearing is concerned.

Speed-Torque Characteristics

Speed-torque characteristics and operating performance is comparable in practically all respects with conventional motors. There is a slight gain in torque output with a given amount of active material due to the radius of gyration being slightly larger than the average radius, but this is of no particular significance. Starting, accelerating, and maximum torques are comparable in all respects since these are determined by design factors that can be incorporated in either type of design. Efficiences are likewise comparable except that friction and windage losses may be slightly higher with the larger motor and one thrust bearing. Power factors are dependent on the length of air gap. In general, the air gap of the motor is a few thousandths of an inch greater to provide smoother starting, maximum efficiency and a more liberal manufacturing tolerance. It is interesting to note that tests conducted on motors with varying air gap definitely prove that stray load losses are increased as the air gap is reduced.

The motor is not intended to supercede or displace the conventional motor in general industrial applications except in those cases where it results in a definite advantage to do so. There are many cases of motor applications, however, where the size and shape of the conventional motor is a decided handicap. The new motor makes a better flange mounted motor, with reduced overhang, and a more accurate mounting. It is ideally suited to gear motors where the motor is mounted as an integral part of the unit. For vertical applications where height is important, it is a "natural". In general, it offers to industry a motor that will assist in expanding and enlarging the manufacture and use of motorized apparatus.

Expanded TOOL STEEL FACILITIES

. . . at Bethlehem include equipment for controlled cooling and inspection after every forging and rolling operation. New cranes and rolling equipment added, facilities mechanized and arranged for more efficient operation and storage areas improved in recently completed modernization program

By R. J. KNERR
Supt. Alloy & Tool Steel Div.
And
H. C. BIGGE
Supt. Tool Steel Dept.
Bethlehem Steel Co.
Bethlehem, Pa.

EXTENSIVE program of modernization and expansion carried out over a period of nearly 1 year, was recently completed in the tool steel department at the Bethlehem plant of Bethlehem Steel Co. New equipment installed consists mainly of heating, controlled-cooling, and heat-treatment facilities, and standard and special machines used in the various finishing operations.

Fully aware of the great care required in maintaining internal soundness in the many tender, heat-sensitive types of tool steels, equipment was provided after every trolled cooling and inspection after every forging and rolling operation. All furnaces used for this purpose, as well as the heating and annealing furnaces, are equipped for automatic control.

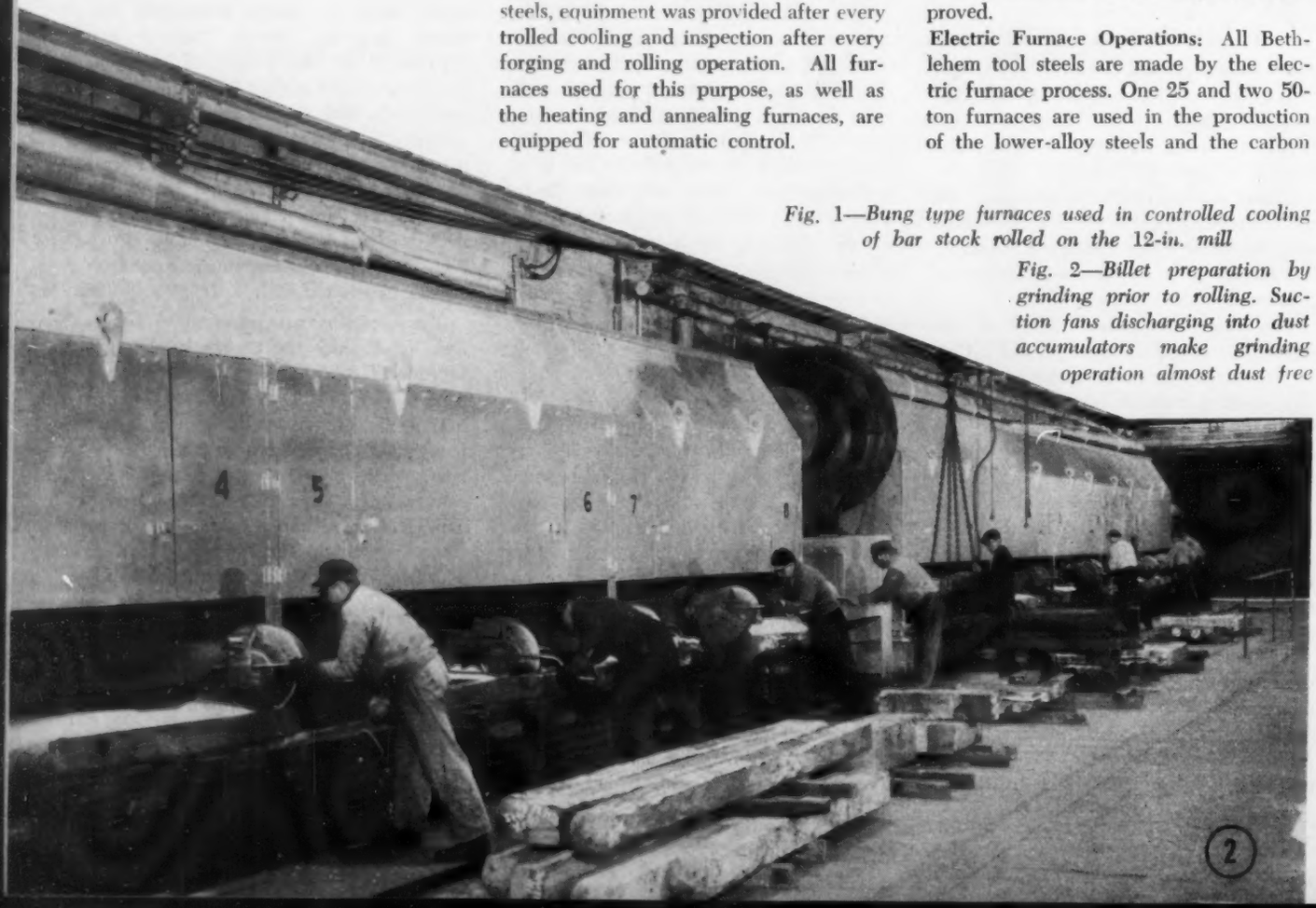
Emphasis also was placed on modernization and improved lay-outs. New cranes and rolling equipment were added, facilities mechanized, and equipment rearranged for more efficient operation. Improved working conditions and greater all-around safety are other advantages accruing from the better arrangement of the plant.

A mill depot, with storage space for tool steels and special steels was erected, and the storage areas for billets, blooms, and finished bars were enlarged and improved.

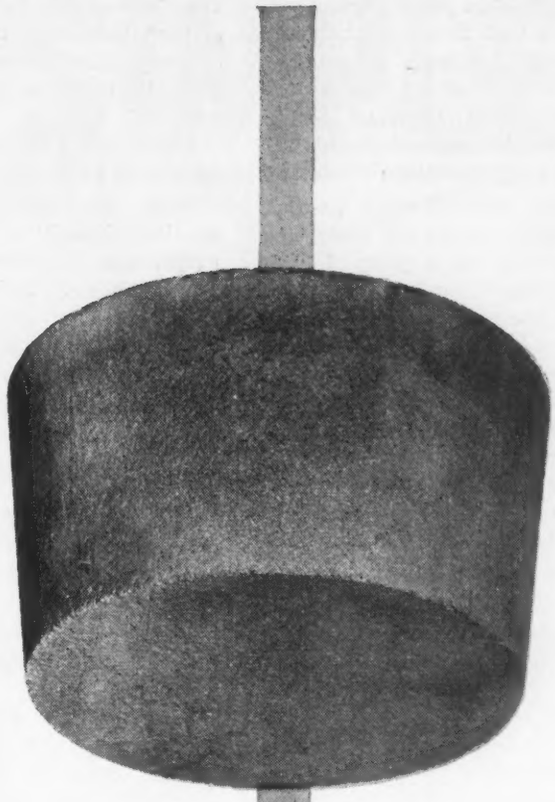
Electric Furnace Operations: All Bethlehem tool steels are made by the electric furnace process. One 25 and two 50-ton furnaces are used in the production of the lower-alloy steels and the carbon

Fig. 1—Bung type furnaces used in controlled cooling of bar stock rolled on the 12-in. mill

Fig. 2—Billet preparation by grinding prior to rolling. Suction fans discharging into dust accumulators make grinding operation almost dust free



Everything you want in a CARBON Mold Plug



"NATIONAL" CARBON MOLD PLUGS have a number of advantages not found in plugs made from other materials. They last longer . . . help to produce better ingots . . . and improve operating efficiency. Here's why:

WITHSTAND THERMAL SHOCK — With "National" carbon mold plugs, the tendency to crack and spall and contaminate the metal is greatly reduced. Ingots are more sound, clean, true to analysis.

RESIST HOT-METAL EROSION — Tests have proved that "National" carbon mold plugs and graphite stool inserts better resist the drastic erosive action of a stream of molten metal. The metal often cuts through some plugs in a single pour, whereas carbon plugs outlast competitive materials several times.

NO STICKING — Hot metal will not stick to carbon mold plugs. The plugs may be used over and over again, depending upon plant practice and size of ingot. They are comparatively light in weight, which greatly facilitates ease of handling.

NOW AVAILABLE — Any size carbon plug can be made. Several sizes are ready for immediate shipment.

FOR MORE INFORMATION on the advantages of "National" carbon mold plugs, write to National Carbon Company, Inc., Dept. ST.

The term "National" is a registered trade-mark of the

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco.

and carbon-vanadium grades. The larger furnaces were built during the last war, while the smallest furnace is about 10 years old. They are all machine-charged and equipped with automatic control devices, eliminating any complicated sequence of manual operations.

High-speed, air-hardening hot-work steels and similar grades are made in a 7-ton arc furnace and a group of three 1000-lb induction furnaces. Two of these, with switch gear and four sets of capacitors, were just installed. The top-charged, 7-ton furnace is equipped with a modern hydraulic roof lift to speed up charging, and with an automatic, continuous electrode regulator to maintain the desired power input and to facilitate a better carbon control. A new 30-ton crane was also installed in this shop.

Production from the 7-ton furnace is normally cast into square hot-top ingots, the cross-section of which ranges from 6 to 16 in. square, according to the size of the finished bar. Experience proved that a 90 per cent reduction in area from ingot to bar is the minimum required to reduce and distribute the carbides which are characteristic of the high-tungsten and the high-carbon chromium steels. Two induction furnaces are generally tapped into one ladle and teemed into ingots ranging from 6 to 13 in. square, and weighing from 200 to 2000 lb.

Ingots from the 7-ton arc furnace and the induction furnaces are either cogged on a 6-ton hammer or rolled on a 16-in. hand mill with specially designed rolls.

Rolled billets in 2 or 2½-in. round sizes are control-cooled, annealed, inspected internally, straightened, rough-turned and returned to mills for rerolling into bars.

Hammer Forging: Immediately upon stripping, the hot ingots are charged into gas-fired preheating furnaces where they are held until the temperature is 1400-1650° F throughout their entire mass. Two furnaces were formerly used for this purpose, but now a third unit is added to permit the greatest possible care in taking the ingots up to the required temperature.

After careful preheating ingots are transferred to a specially designed two-chamber, gas-fired furnace where they are slowly brought to the desired forging temperature, 2100-2300° F, depending upon the grade. They are then reduced to billet sizes on a 6-ton steam hammer equipped with a manipulator.

Resulting billets are buried in diatomaceous earth for slow cooling over a period of up to 100 hours. They are then placed in boxes and annealed at approximately 1400° F in a furnace with bung-type roof, equipped with pyrometer control and fired with combination oil-and-gas burners. For increased flexibility this furnace, which is 37-ft long, has removable bulkheads, making it possible to operate it as multiple units, if desired.

After cooling, annealed billets are tested for internal defects by hot-acid etching. They are then ground to remove surface imperfections prior to further reduction to bar size on smaller hammers and in rolling mills. Some of the larger size billets may first be given an additional break-down in a 16-in. roughing mill, followed by controlled cooling, annealing and spot grinding. All grinding is carried out in special booths, under suction, making the operation virtually dust free.

Forging on Smaller Hammers: Four forging hammers, of 1000, 1500, 2500, and 4500-lb capacity are available. Largest of these was just equipped with a 3-ton manipulator and turn table, and the 2500-lb hammer with overhead, crane-operated tongs, while the two smallest units are manually operated.

A number of other improvements were also completed in this shop. All former heating furnaces were torn out and replaced with the latest type furnaces designed to give maximum flexibility in heating operations. These are all of the twin-chamber type, with steam-atomized oil firing, and are capable of heating 1 to 10-in. square billets from room temperature to 2300° F. Two of the furnaces have a rated capacity of 800 lb of steel per hour, the other two a capacity of 1000 lb per hour. They feature insulated, arch-type roof and twin-doors in each chamber. The firing is manually controlled, and each chamber includes a pyrometer. The furnace pressure is controlled automatically.

After forging, the bars are placed in boxes and covered with diatomaceous earth for slow cooling.

Rolling Billets: Annealed and inspected billets from the 6-ton hammer or the 16-in. roughing mill may also be reduced to bar sizes on a 9 and a 12-in. hand mill. A large number of changes were completed in these mills, particularly in the heating, holding and controlled-cooling facilities.

Both mills operate side by side in the same mill building, each being served by two heating furnaces. One of these is a new continuous-type, oil-fired unit. The other three are of the compartment-type, and were completely rebuilt and equipped for oil firing, with automatic regulation.

The continuous furnace which serves the 12-in. mill is of the suspended-roof type, with end charging and side discharge. It has a hearth 50 ft long, with steel skids the first few feet inside the charging door, and six rows of silicon-carbide skids for the remainder of the distance. Billets up to 6¼-in. square, in lengths up to 7 ft, with a maximum weight of 1080 lb, may be charged, with the shorter lengths arranged in double rows if desired.

A movable-damper type knuckle which can be set to extend down to 7 in. from the hearth divides the furnace into a preheating zone where the cold billets are brought up to 1400° F, and a heating zone where the temperature is raised to 2150 to 2250° F, depending upon the grade of steel heated.

When heating cold tool-steel billets up to 2150° F, the furnace is capable of handling up to 10 tons per hour, with a fuel consumption of 1,800,000 Btu. per hour. Six burners are arranged in the heating zone and three in each side wall in the preheating zone. Full automatic control of the temperature,

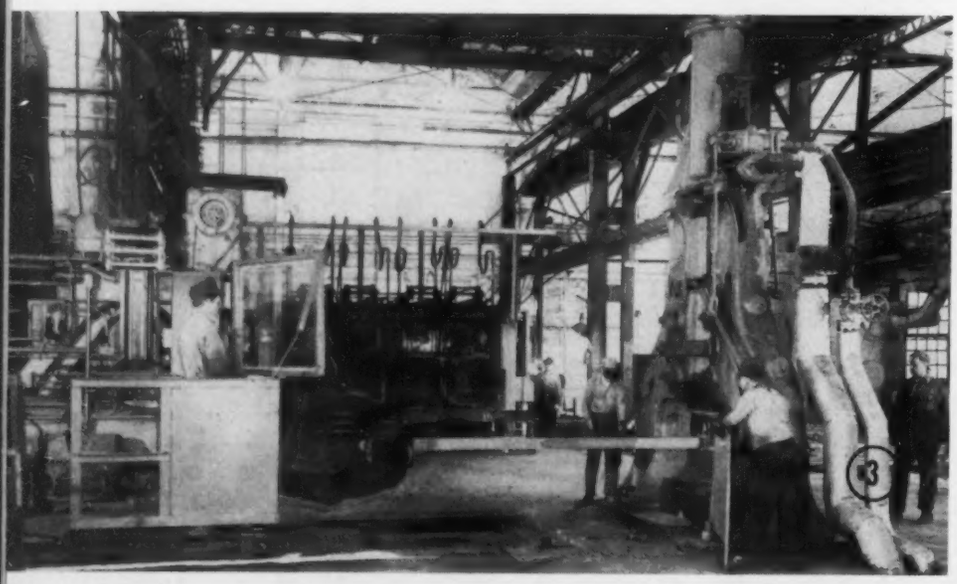
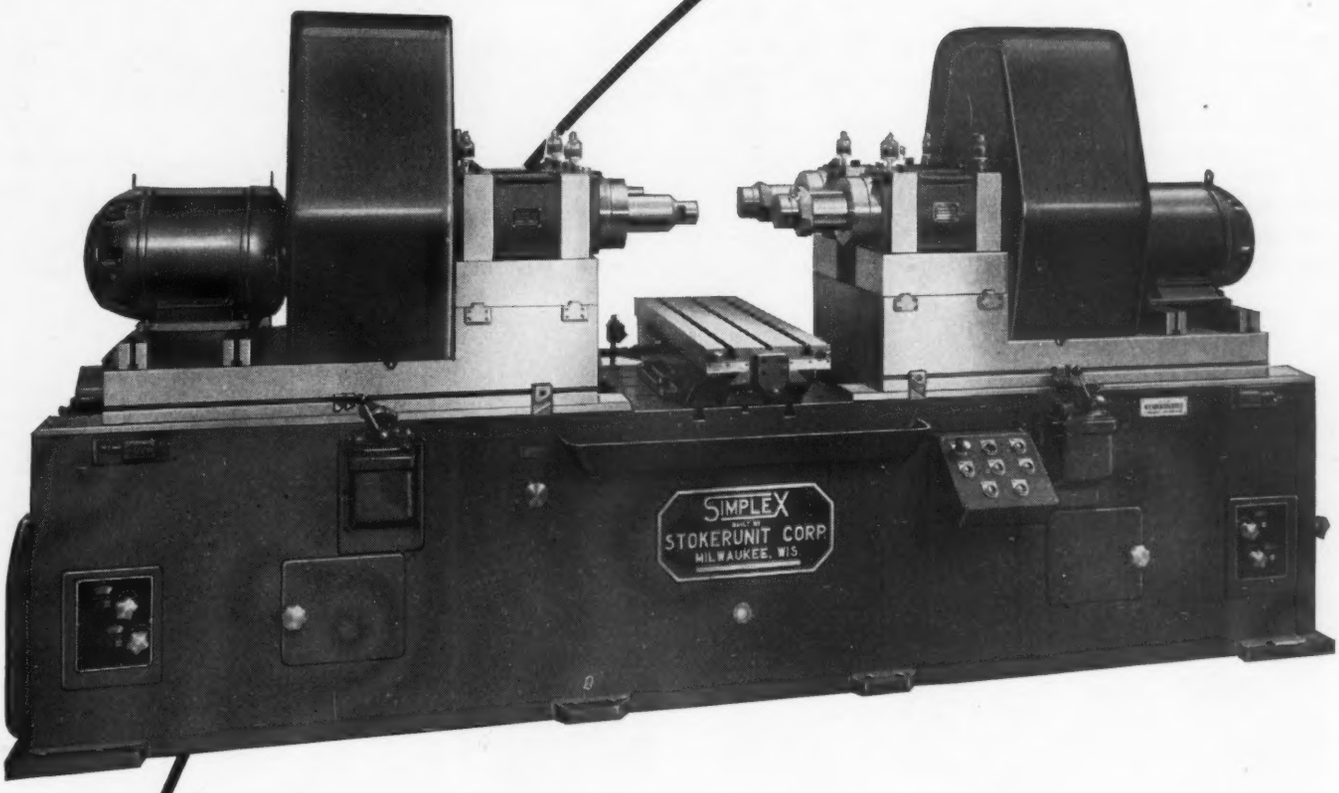


Fig. 3—Six-ton hammer, with charging machine and manipulator, used in forging tool steel ingots

SIMPLEX

Increasing wage rates of today make necessary new methods of reducing costs. At medium production rates, this becomes difficult with general purpose machine tools. Simple multiple tooling and fixtures, indexing from roughing to finishing position, offer a new cost reduction method. Tooling costs are low — job possibilities endless.



This photograph shows a SIMPLEX 4U 2-way Precision Boring Machine equipped with four #4 spindles and a hydraulically indexed sliding table operating between adjustable positive stops. On the sliding base a single work holding fixture is mounted providing for operating on the work from both ends. After the roughing operation is completed on both ends, the table is indexed to the finishing position, the finishing operations are performed on both ends simultaneously and the completed job is ready to remove from the fixture to change to the next job. The fixture and tools are removed and retained intact, ready for a quick set-up when the job is again run. The automatic cycle relieves the operator and helps maintain predetermined production schedules.

Precision Boring Machines

STOKERUNIT CORPORATION

SIMPLEX Machine Tools Division

4532 West Mitchell Street, Milwaukee 14, Wisconsin

Precision Boring Machines, Planer Type Milling Machines and Special Machine Tools

furnace pressure, and air-fuel ratio is maintained in both zones.

The three other heating furnaces include a single-chamber unit for the 9-in. mill, and two double-chamber units of identical construction, one for each mill. These are all equipped for oil-firing, with pyrometer control in each chamber, and with automatic furnace-pressure reglation.

This arrangement of the heating furnaces gives a high degree of flexibility in the heating schedule, permitting the rolling of grades requiring different heating cycles on the same schedule. A new 42-in. saw, with gage, cooling bed and run-out table, was also installed in the 12-in. mill.

Controlled Cooling of Bars: Extensive facilities for controlled cooling were also added at the two mills. These include three electrically-heated holding furnaces and two large, oil-fired furnaces for controlled-cooling.

Holding furnaces are used for storing sheared bars coming from the cooling beds, prior to controlled cooling or annealing. They are insulated and equipped with covers with heating elements arranged along the sides. Two double-chamber, bung-type furnaces are used for controlled cooling. These are 35 and 37 ft long, and are fired with gas or oil and have a pyrometer control in each chamber.

Annealing: Before the forged or rolled bars can be processed further by cold working without danger of cracking they must be thoroughly annealed and cooled slowly from above the critical range. This operation has a softening effect and it also serves to remove stresses and refine the grain structure.

All types of tool steels are somewhat subject to decarburization during annealing, and almost any type is susceptible to grain growth if the temperature is too high. Four bell-type furnaces with atmospheric control were installed to overcome these tendencies. These are equipped with five bases and five stainless steel inner covers over the charge. A neutral atmosphere is circulated under the covers during the annealing cycle. The atmosphere consists of a mixture of nitrogen and propane, in various ratios according to requirements. An airtight oil seal prevents infiltration of outside air or the products of combustion.

The furnaces are used for annealing steels such as the high-speed and air-hardening types produced on the hammers and the hand mills. They are capable of heating tool-steel bars from room temperature up to 1680° F without surface decarburization. A maximum temperature variation of plus or minus 5° F from one end of the charge to the other is allowed during the soaking and cooling cycle. The furnace capacity is 5 tons of bars, in lengths of from 10 to 13 ft.

Eight cradle assemblies of alloy castings are used for loading bars on the bases. Each cover is equipped with 20 burners operating on desulphurized gas. The furnaces have automatic temperature regulation and recording for controlling the annealing cycle.

Annealing cycles selected depend upon composition of the steel and the customer's requirements. In majority of cases a spheroidized structure is desired. In tool steels such a structure offers minimum hardness combined with maximum machinability. In hypereutectoid steels it is also necessary to have the anneal break up the complex carbide network which forms upon forging or rolling. The breaking-up of this network is necessary to prevent brittleness in the hardened tool. In some cases a preliminary heat treatment consisting of either normalizing or oil quenching is used to insure the production of a fully spheroidized structure in annealing.

Annealed bars are given a careful surface inspection and the crop ends are sawed. They are then tested for hardness and decarburized surface, and for internal defects as determined by the hot acid etch.

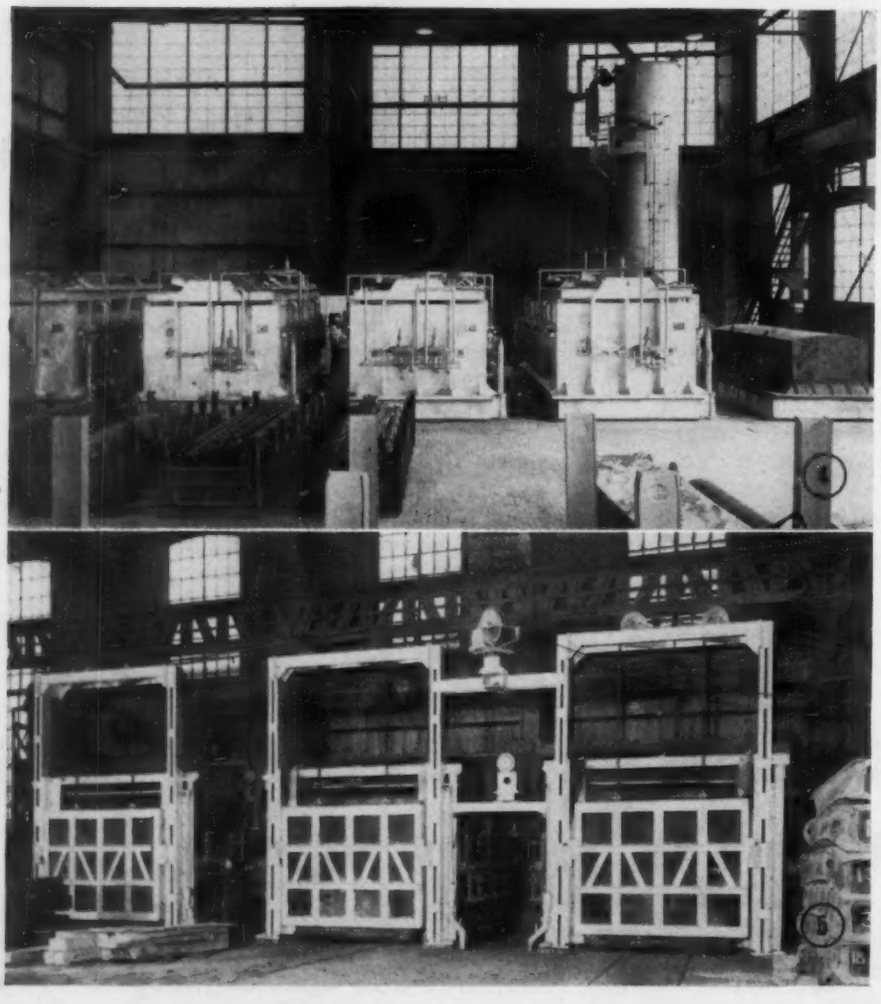
Bars that have satisfactorily passed inspection are processed in the cold-finishing section. Here they are straightened, cut to length, rough turned, ground and polished, and identified for shipment. Each individual bar is spark tested prior to shipment.

Finishing Department: Due to the nature of the product the tool steel manufacturer must take every precaution to guard against defects in the finished material. Careful inspection through all operations is essential to insure uniform and high quality. Testing methods used generally depend upon customers' specifications, but many tests are carried out throughout operations regardless of specifications.

To facilitate final testing and inspec-

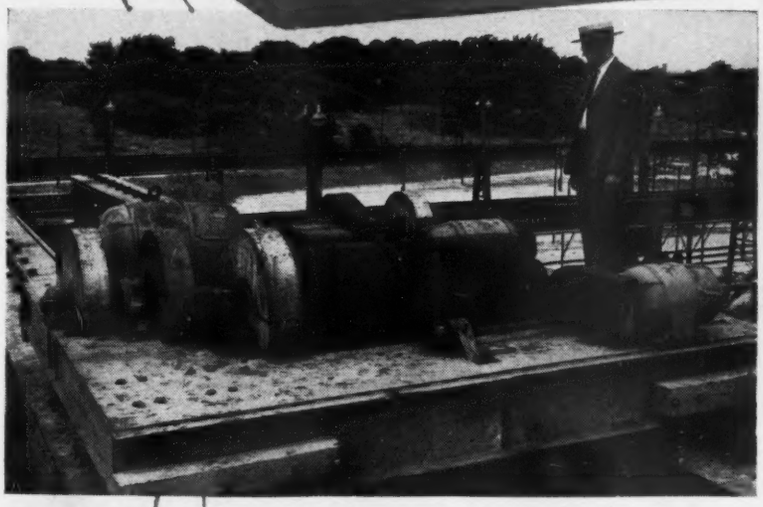
Fig. 4—Bell type furnaces used in annealing tool steel bars. Furnaces are equipped with stainless steel inner covers under which a mixture of nitrogen and propane is circulated during the annealing cycle

Fig. 5—Gas-fired furnaces used in preheating tool steel ingots prior to hammer forging



CENTURY Slip Ring Motors

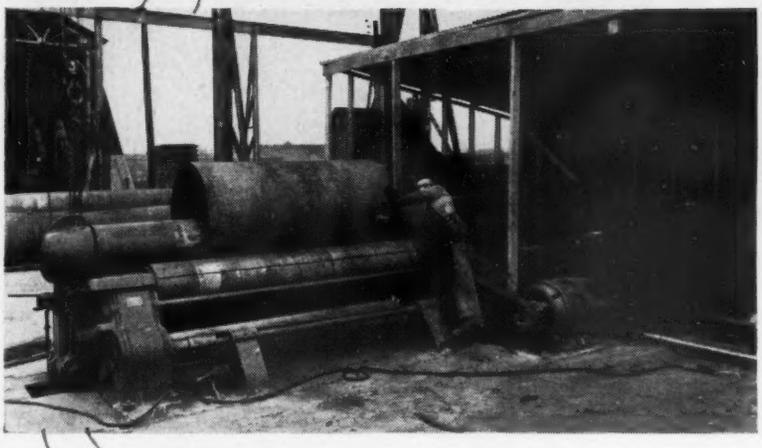
Provide Maximum Flexibility — For Speed Regulation . . . Torque Control . . . Reversing Direction of Rotation



The two installations shown here demonstrate how Century Slip Ring Motors provide the flexibility needed to meet varying load conditions.

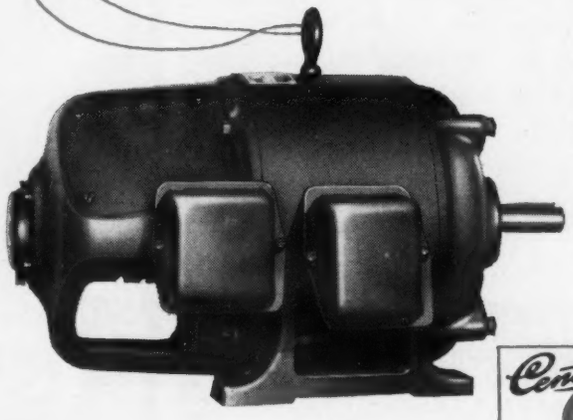
1 Illustration No. 1 shows 4 Century Totally Enclosed Slip Ring Motors on an outdoor crane. One motor powers the crane travel, one the carriage cross travel, one on small load hook and one on large load hook.

Century Slip Ring Motors provide variable speeds for the travel and hoist motions of the crane. Reversing direction of rotation permits crane travel in either direction.



2 In Illustration No. 2 the bending roll is driven by 2 Century Slip Ring Motors—75 horsepower and 30 horsepower. One operates the two power rolls and the other raises and lowers the third roll which regulates the amount of curvature of the steel plate.

Because plate thickness up to $1\frac{7}{8}$" are handled, this machine requires a great variety of speeds and torque. Low starting current is another requirement which is easily met by Century Slip Ring Motors.



When your requirements demand that electric motors have flexibility for speed variation, torque control, reversing of direction of rotation and high starting torque with low starting current, specify Century Slip Ring Motors.

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Century C MOTORS

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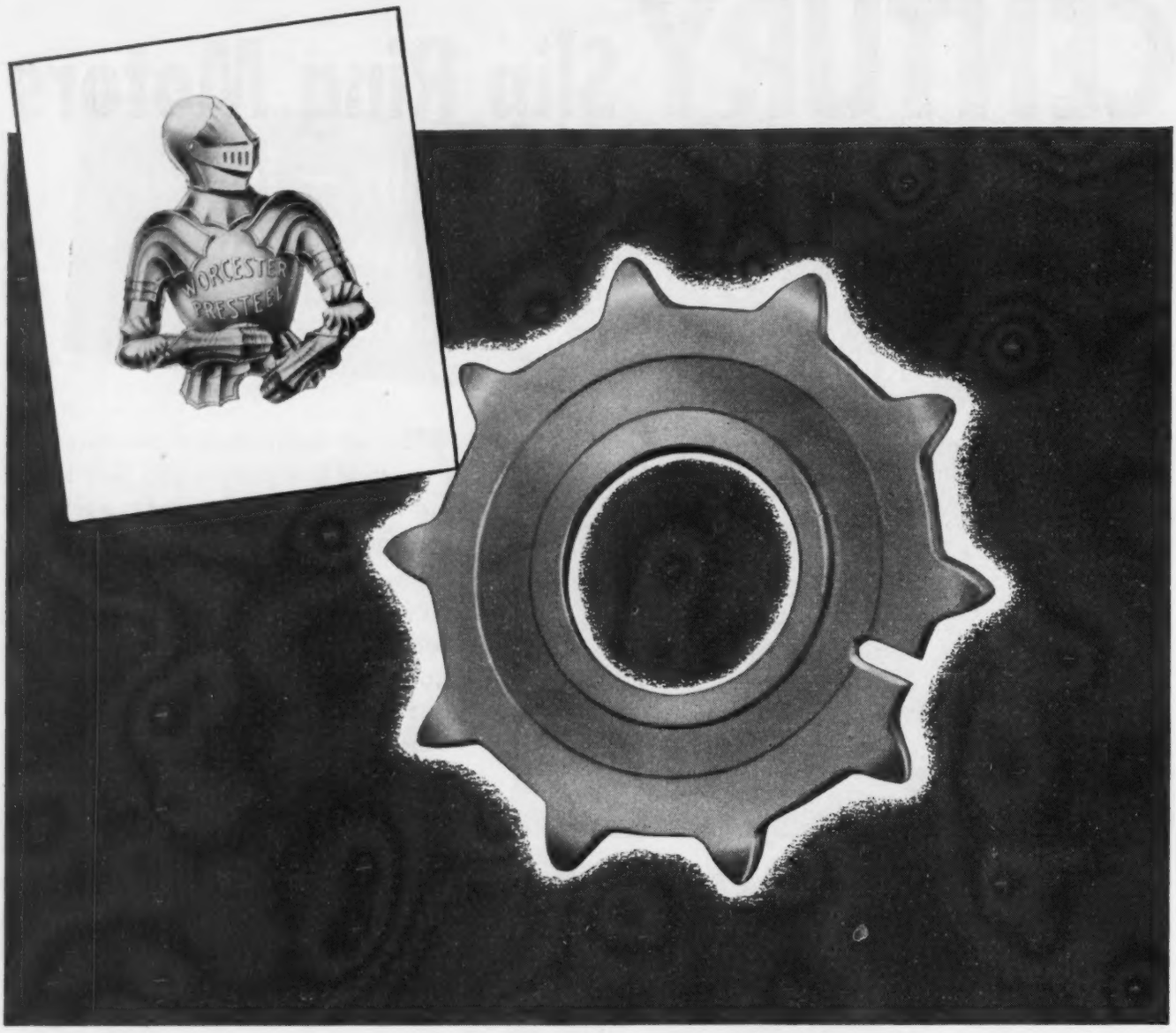

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tion, all equipment used for this purpose is located in a new building. Here are assembled the necessary inspection stands, stock racks, saws, and similar equipment used in this work. This building also has a separate room for hot acid etch testing.

By relocating the testing equipment and providing additional storage for finished bars, much extra space is made available in the finishing building. This also permits a more efficient arrangement of the existing facilities in the building. Several new machines also were installed, including four centerless grinders, two polishing machines, two bar-turning machines and one large straightener for rounds up to 5-in. diameter.

Formerly all ingot, billet, and bloom stock was kept in an out-door storage space. This yard is now fully enclosed. It includes extra space under the same roof consisting of large floor areas finished in concrete, with ample crane service in all directions. Present enclosed storage areas include one yard 75 x 450 ft, one 60 x 300 ft, and 80 x 120 ft.

Operation of Larger Arc Furnaces: The one 25 and the two 50-ton electric arc furnaces are used in the production of the lower-alloy type of tool steels and the simpler high-carbon and carbon-vanadium tool steels.

Heats from these furnaces are cast in larger ingot molds than those used for the 7-ton arc furnace. Most commonly used sizes are 15 x 22 in. (5200 lb); 17 x 20 (7200 lb); 22 in. and 27 in. corrugated (7800 and 13,000 lb).

With the great reduction in cross-sectional area obtained in the hot working of these large ingots a grain refinement is attained equaling that obtained in hot working the smaller ingots from the 7-ton furnace.

After stripping, the hot ingots are placed in heated, carefully controlled soaking pits where they remain, without firing, until their temperature is equal to that of the pit. They are then heated to the prescribed temperature, ranging between 1950 and 2300° F, depending upon their composition.

Uniformly heated ingots are placed on a roller line and taken to the 35 in. blooming mill for rolling into blooms and billets. Some steels are rolled directly into billets, but the more sensitive tool steel grades require a reheating operation during the break-down.

Upon completion of rolling, discards and crops are taken, representing top and bottom of the ingot. Test samples are also cut from the billets representing top, center and bottom section of the ingots. These are tested for chemical composition, grain size and hardenability.

All billets are hot stamped with heat number, and the billets representing the top, which later are to be tested by hot acid etching, are also identified. The hot acid etch test is most widely used

(*Please turn to Page* 132)

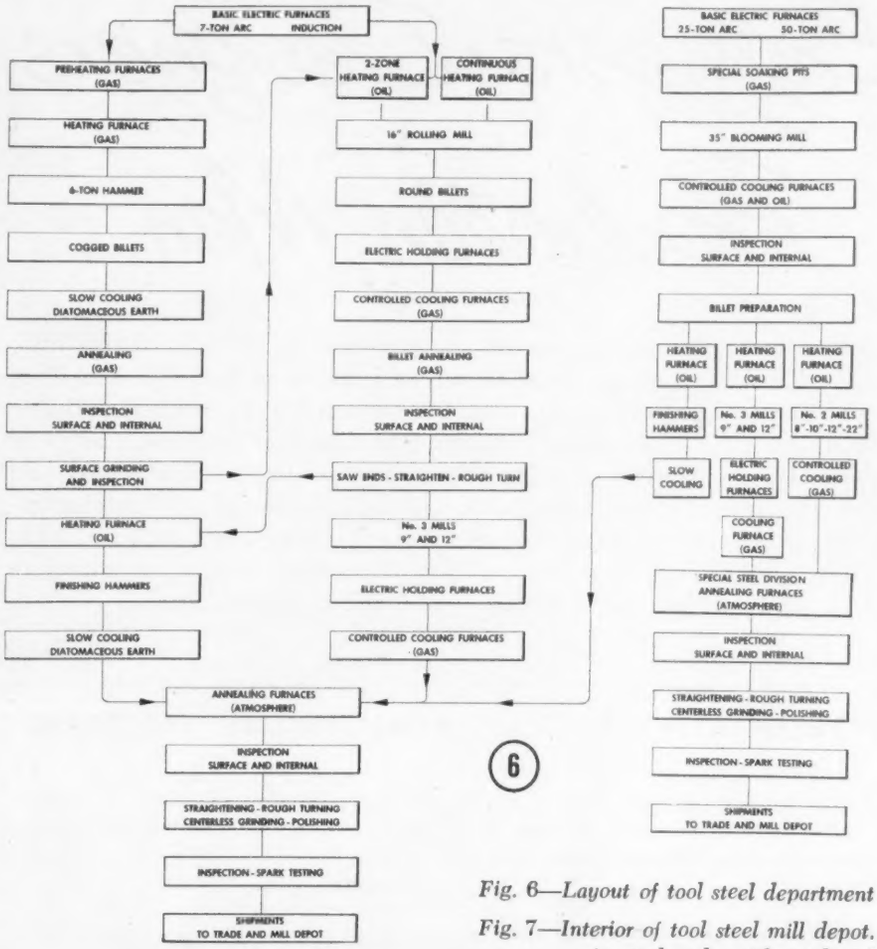
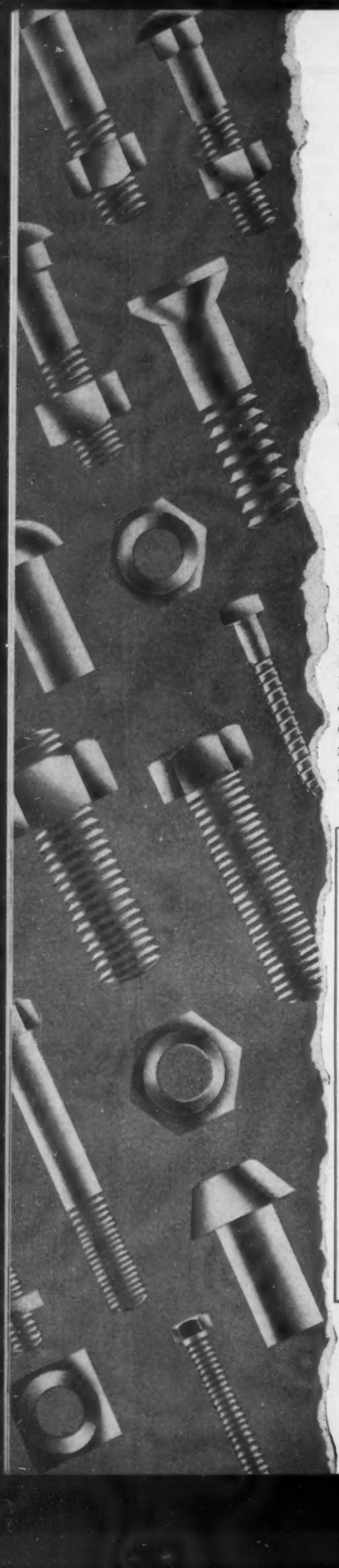


Fig. 6—Layout of tool steel department

Fig. 7—Interior of tool steel mill depot. Stock ready for shipment is stored in steel racks with total of 3400 compartments



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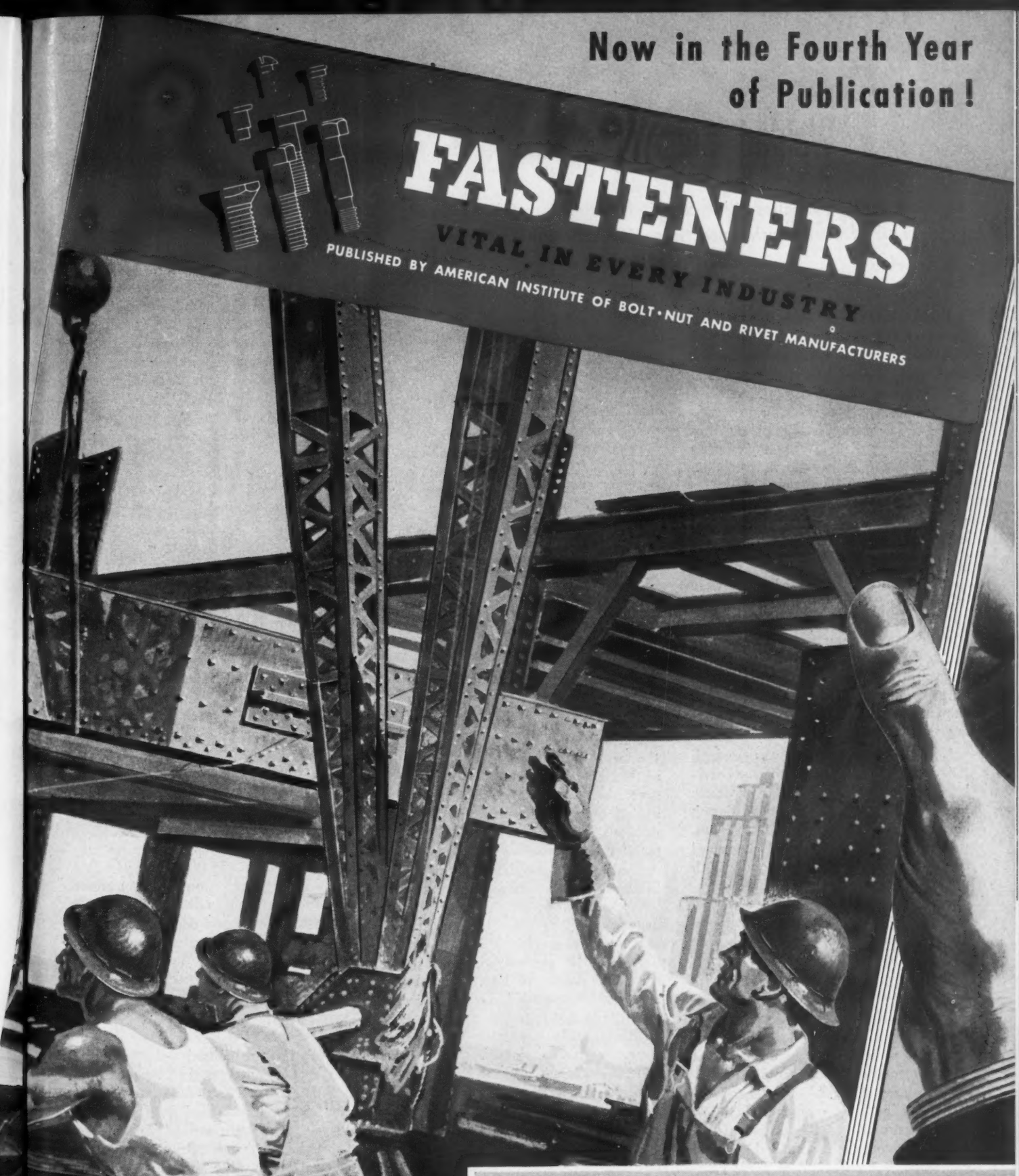

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By E. C. KREUTZBERG
Washington Editor, STEEL

Welded Ship Fractures

. . . caused by notches either built into vessels through design or as result of workmanship practices. Investigation vindicates all-welded construction

FOLLOWING an extensive investigation of the sensational ship breakages that created major uncertainties for the steel and shipbuilding industries, and for the personnel of the Maritime Commission, by injecting doubts as to soundness of the wartime shipbuilding program, the board of investigation reports that "the results of the investigation have vindicated the all-welded ship."

Headed by Rear Admiral Harvey F. Johnson, engineer-in-chief of the United States Coast Guard, now retired, the board sums up its finding as follows:

"The fractures in welded ships were caused by notches built into the vessels, either through design or as the result of workmanship practices, and by steel which was notch sensitive at operating temperatures. When an adverse combination of these factors occurs, the ship may be unable to resist the bending moments of normal services."

Epidemic of fractures was curbed, the report states, "through the combined effect of the corrective measures taken on the structure of ships during construction and after completion, improvements in design, and improved construction practices in shipyards. With proper detail design, high quality workmanship and a steel which has low notch sensitivity at operating temperatures, a satisfactory all-welded ship structure may be obtained."

Widespread belief that the fracture menace was confined to Liberty ships was shattered by the report; actually it involved vessels of all types. The report also finds some comfort in the fact that "the percentage of ships sustaining serious fractures is small." The board did find that out of approximately 5000 ships constructed in the course of the war about one-fifth sustained fracture casualties. But only 127 of these casualties were classified as "serious." Eight vessels were lost, and it was found "extremely fortunate that only 26 persons lost their lives."

The board takes the view that its investigation has produced partial answers to most of the urgent questions in connection with breakage of welded ships, and has provided an adequate solution for present purposes. For example, says the report, "until experience can be had with vessels constructed under normal conditions of improved design, materials and workmanship, some form of crack arrestor, such as a riveted gunwale angle, should be incorporated in the hull girder of all large welded vessels."

However, there is much more work of a fundamental research character in the field of ship design and construction to be done, the report concludes.

Investigation, which lasted 3 years, entailed work on many research projects initiated under the National Defense Research Committee and carried out with the services of the welding group of the War Metallurgy Committee of the National Research Council.

Results of Investigation

"In the investigation of detailed design," says the report, "it became apparent that the monolithic character of the welded ship resulting from the method of fabrication can produce high stress concentrations and severe restraint, thereby tending to inhibit plastic flow. (The fractures in many cases manifested themselves with explosive suddenness and exhibited a quality of brittleness not ordinarily associated with the behavior of a normally ductile material such as ship steel, the report says in another place.) This condition did not exist generally in the riveted ship. The danger of high concentration at points of structural discontinuities in the welded ship is further aggravated by welding usually present at such points. Every fracture examined started in a geometric discontinuity or notch resulting from unsuitable design or poor workmanship. The investigation strongly emphasized that too much attention cannot be paid to the elimination of discontinuities or notches, whether they be small or large, and that the effect of discontinuities is aggravated by welding."

The board found that steel furnished to the shipyards complied in every respect with present physical requirements. "In spite of this, impact test of steel samples taken from vessels which had suffered fractures indicated that in many cases the steel was notch sensitive. In addition, it was found that some steels furnished to shipyards were also notch sensitive. There is a necessity for the establishment of a new specification to include a practical test for the evaluation of the notch sensitivity of commercial steels."

The board found no indication that inferior quality or misapplication of welding electrodes was responsible for welded ship fractures. "This does not mean, however, that an improvement in electrodes and covering materials might not be beneficial." It found no basis for a widespread belief that ship fractures were the result of locked-in stresses. "The results of the investigation," says the report, "have not sustained this belief. Although a large amount of work was conducted in the investigation of residual and lock-in stresses, resulting in a considerable extension of knowledge in this respect, no evidence has been found that these stresses are important in causing the fractures of welded ships."

But the board did find that the standard workmanship had suffered under wartime pressures. "Poor workmanship engenders fractures since a fracture may originate at a small notch such as occasioned by peened-over cracks and under-cut welds, by porosity and inclusions in the welds, or by 'saddle' welds resulting from incomplete penetration, which leaves voids in the center of the joints. High quality workmanship is still an important need in the building of welded ships."

Operating conditions were in no way responsible for the fractures; loading and ballasting procedures did not create abnormal bending moments. The highest incidence of fractures occurred in northern waters which are extremely cold and which are featured by heavy seas. The report said that the risks from heavy seas had been anticipated but that the adverse results of low temperatures came as a surprise.

Following submission of its report the board, known as the "Board to Investigate the Design and Methods of Construction of Welded Steel Merchant Vessels" has been dissolved. In its place, to conduct such research work on a permanent basis, the Secretary of the Treasury has appointed a Ship Structure Committee, served by a Ship Structure Subcommittee, as follows:

Ship Structure Committee: Adm. Ellis Reed-Hill, USCG, engineer-in-chief, chairman; Adm. Charles D. Wheelock, USN, deputy and assistant chief of the Bureau of Ships, member; David Arnott, vice president-chief surveyor, American Bureau of Shipping, member; James L. Bates, managing director, technical divi-

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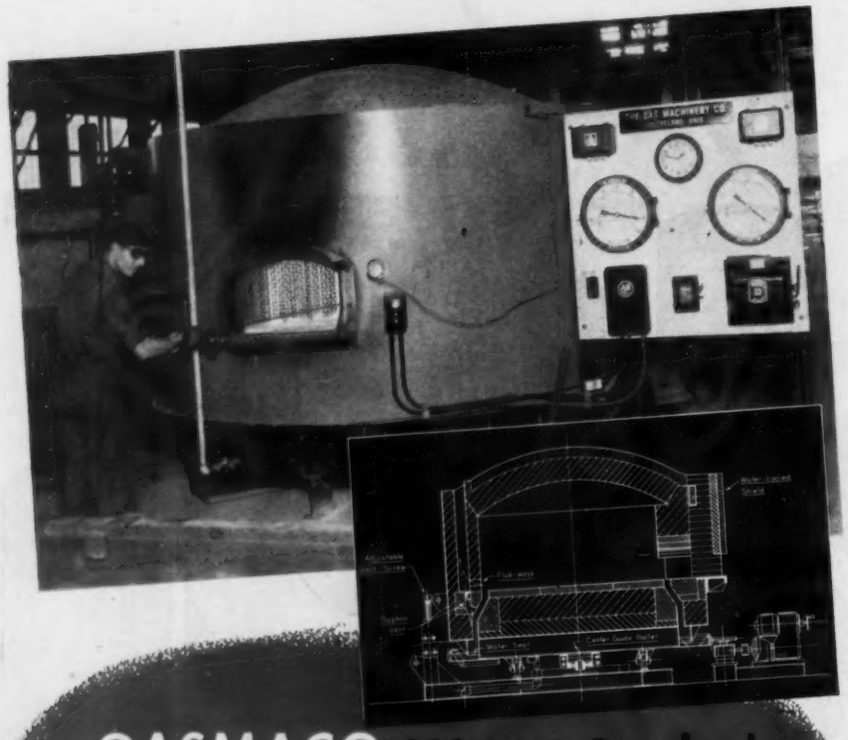

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Zinc Alloy Dies

(*Continued from Page* 96)

ficiencies in the die components make themselves apparent. When it is thought that the die components are working in conformity with one another, and the operation from this angle is considered satisfactory, a panel is tried out, the press again being operated in progressive stages. Condition of the panel will reveal the extent of the corrective work that has to be done to the die. The first panel, if in good condition, can be used for spotting purposes by painting it with Prussian blue on both sides. This is periodically inserted into the die so that the marks left by the paint will reveal the points to be rectified. After this panel has served its purpose, later panels treated in the same manner can be used for spotting.

Real problem to be overcome is that of drawing the metal smoothly into the shape desired without buckling, crinkling, dragging or binding. The solution of these problems depends on the proper preparation of ring surfaces, the punch and its opposite member, if one is used. When used in ring surfaces, draw beads and their opposing grooves demand careful consideration. Certain principles have been established by experience in connection with draw beads in general as follows:

Steel beads of equal size have more binding strength than those of Kirksite, probably because of the "oiliness" of the alloy. When there is not sufficient binding strength to draw the metal properly, two or more beads will supply the necessary

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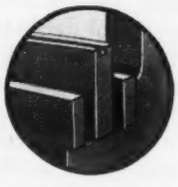

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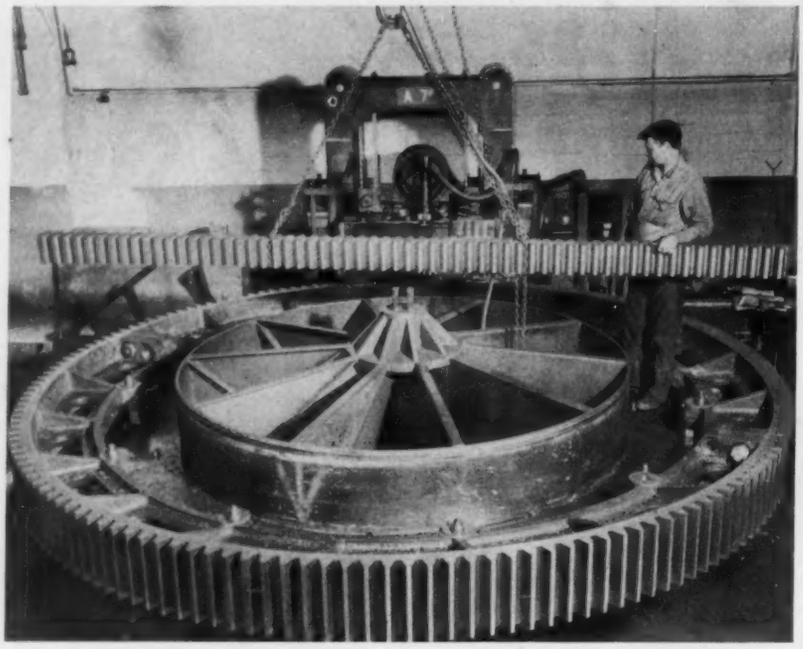

ONE-PIECE GEAR: Believed to be the largest one-piece gear of its type ever cut on the west coast, this 180½-in. diameter spur gear is shown here being cut on a machine specially designed and built by Western Gear Works, Seattle. One of a set of four, this huge gear, complete with pinions, was made for F. L. Smidth & Co. for use on cement kilns. The gear has 160 teeth, 3½-in. circular pitch and 14-in. face. There is no relationship to the large double-faced rack except that both rack and gear were cut on the same machine

grip, without entailing the additional press pressure one large bead would require. When it is desired to reduce the binding strength, care should be exercised in grinding down the draw bead height, as a large part of this strength lies in the sharp radius set up between the bead and the groove. Positioning and number of draw beads is perhaps the most important element, other than the die contour itself, in successfully obtaining satisfactory panels. After considerable experimental work, the Fisher Body Division has adopted as standard a half oval bead stock of mild steel, SAE 1010, ⅜-in. in diameter and ⅛-in. in depth.

When beads are not cast in the draw ring, or additional ones are required, a groove is cut in the ring to a depth of ⅛-in. by ⅜-in. wide and a predrilled section of bead stock is attached with countersunk rivets, dowels or screws. Beads are originally placed so that the side toward the die center is ¾-in. from the edge of the draw ring, unless this area of the drawn sheet is to form part of the panel. In this case, the beads are set back proportionately.

Following attachment of beads in the draw ring, corresponding grooves are cut in the opposite draw ring, to a depth and width sufficient to accommodate the bead and the sheet stock being drawn. The dimensions of such grooves should be determined accurately for each gage of metal. The grooves are usually cut with a chisel preferably mounted in a pneumatic hammer. Finishing is done with round files bent to convenient shape or with cutters and grinding wheels mounted in a portable power tool.

As indicated previously, the grip on the sheet metal being drawn is due to the radius of the arc set up between the draw bead and groove, the fit of the draw rings and press pressure. The drag on the metal can be reduced by grinding down the draw bead or by trimming the corners of the groove or both. A slight alteration to any of these dimensions will affect the drawing characteristics considerably.

Users of the first Kirksite draw dies experienced some difficulty in drawing panels of uniform quality. This was traced to a variable pressure on the sheet metal between the draw rings, due primarily to play in the press adjusting mechanism and to a lesser extent to the nature of the alloy itself. After some experimenting, this condition was overcome by providing steel blocks to control the space between the draw rings. For aluminum, best results are obtained by adjusting the blocks so that the space between the rings is held to 0.003-in. under the metal thickness. Present practice indicates that this setting is also satisfactory for steel.

Use of spacer blocks is now standard practice and provisions for this method of obtaining equalized pressure should be made on all draw die designs, although it has been established that the smaller dies, having a regular contour, will work satisfactorily without them when pressing steel panels. Normally, one block in each corner of a die is sufficient to provide equalized pressure. Large or irregularly shaped dies will require additional spacers at critical points. The number and location can best be determined by evaluating the need for each particular job.

Equalizer blocks are usually mounted in recesses in the lower draw ring. If their location interferes with the positioning of a blank, bosses on the casting can be provided. The corresponding or bearing points on the upper draw ring must be machined parallel to insure a full bearing for the blocks. The equalizer blocks are usually secured into the recesses with one fillister head screw. Thickness of the blocks should be approximately 0.010 to 0.015-in. under actual size requirements so that shims can be used for adjustment after the ring surface corrections are completed during tryout.

Chrome Plating and Metallizing

It has been established by experiment that the durability of Kirksite dies can be increased by hard chrome plating and metallizing. However, there is insufficient experience along these lines to present data as to the degree die life can be increased by the use of these special processes.

Dies made of this zinc base alloy can be altered or repaired readily with the parent metal. Minor alterations and repairs are done by acetylene welding and major jobs can be handled by casting a new section to the die in the tool room. The latter procedure is of considerable importance for rectifying errors in design or for effecting repairs that would otherwise require the casting of new die components.

Four factors are involved in successful welding: (1) Proper welding rod. (2) Preheating the casting. (3) Positioning the die. (4) Type of flame. The best Kirksite welding rod is an extruded rod ⅜-in. in diameter. However, when this is not available some of the alloy can be melted in a ladle and poured into a suitable mold. In an emergency the metal may be cast into a piece of ¾-in. angle iron. As the alloy is an excellent heat conductor, a large area must be preheated, much in the same way as with aluminum or copper. Generally speaking, the area around the point to be welded should be preheated to the same extent as in brazing a cast iron piece of the same size. Usually two torches are needed for this purpose on all but the smallest casting and the actual temperature of this general area should be between 300-400° F.

When the general area has been pre-

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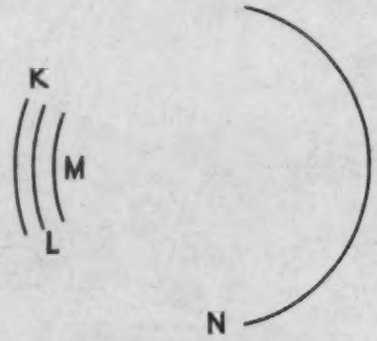

A. If circle N were completed, would it meet K, L, or M?

B. Are the heavier lines above really straight, or curved?

C. What size is this Socket Screw?

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Any assembly worker can spot the right size without effort – no need to waste time – no need to guess and risk errors. The correct size is clearly marked on the head.

At the tool-crib, left-over, mixed-up screws are quickly sorted and put back in the proper bins, without slow "miking" or gauging.

A valuable sales feature, too. Ask any maintenance man who service your product after it's sold. He'll appreciate P-K Size-Marked Screws because he can easily tell which ones go where when reassembling.

Plus – GEAR GRIP*

Gear Grip makes Size-Marked Screws slip-proof, even when fingers are oily. Only Parker-Kalon offers Socket Head Cap Screws with both features. Write for samples, today. Parker-Kalon Corporation, 200 Varick Street, New York 14, New York.

ANSWERS

A. N and M are arcs of the same circle.
B. The lines are curved.
C. When it's P-K Size-Marked, there's no question!

*U. S. PAT. No. 126,409

ANOTHER P-K FIRST

GROUND THREAD
Socket Set Screws

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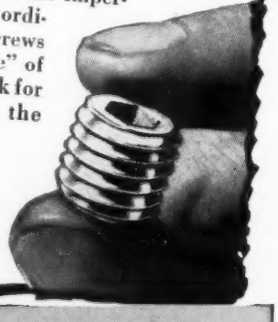

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heated to the proper temperature, more heat is concentrated on the specific area to be welded until a molten pool of metal is formed. If the casting has not been sufficiently preheated, the weld metal will burn and foul the surface to be welded, necessitating further heating and removal of these resultant oxides before proceeding. Casting temperature can be checked by holding the tip of the welding torch close to the die for a few seconds, and if small pools of molten metal are not formed in the localized area immediately under the tip, additional heating is necessary.

Portion of the die to be welded should be positioned horizontally while the surface is being built up. When the surface to be welded is curved, it is necessary to rotate the die slightly so that the immediate section being worked on is as nearly horizontal as is practicable. In this operation, a reducing flame is used, an excess of acetylene being given to the torch when preparing to melt the welding rod. The point of the flame should never be brought into contact with the casting or the melted pool of metal.

Building Up Worn Dies

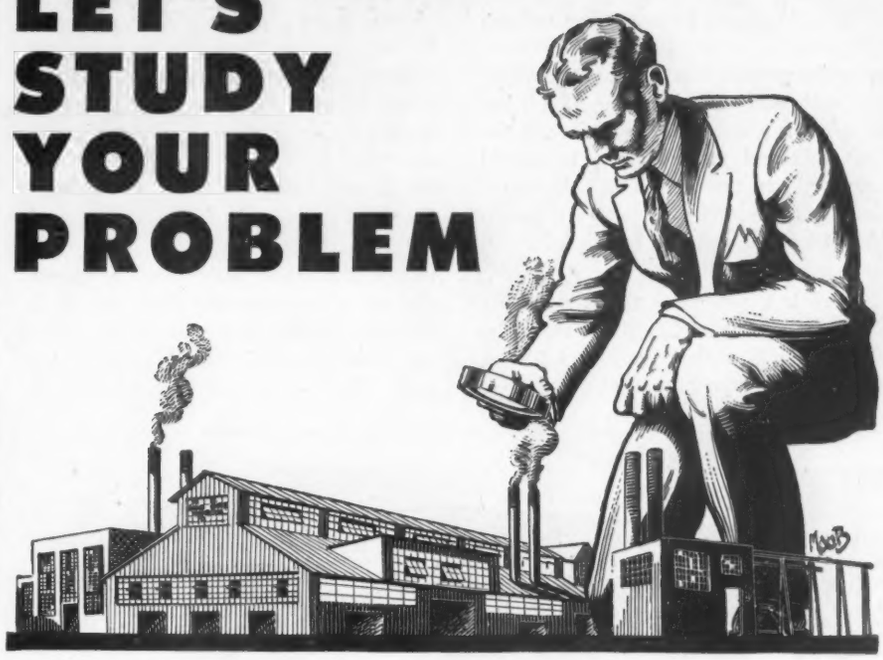
Technique of building up worn dies is a fusing or puddling operation rather than a welding process, and is a little difficult to master because of the absence of any plastic range in the alloy. The important difference between this and other welding, lies in the need for breaking through the oxide film over the molten pool of metal mechanically with the welding rod, and then adding molten metal from within this oxide envelope, which covers the tip of the rod and the weld.

The term "recasting" as applied to the process of casting new sections in Kirksite dies perhaps may be somewhat misleading, but a more appropriate name can hardly be given to a method which literally permits new sections to be cast on dies. This process is of major importance and can be used to rectify damage and errors in design which ordinarily would require new castings.

Part to be recast first is thoroughly cleaned and then preheated. If the section to be recast is at a point of high stress, it is advisable to provide some means of anchoring the recast section. This can be effected by drilling and tapping the casting in order that several bolts can be screwed into the section. The protruding heads and a portion of the body will provide effective anchorage. A frame or fence of sheet metal, or asbestos covered plywood, is clamped to the edge of the casting, or a dam of clay is built up to retain the molten metal. If the latter course is taken, ordinary fireclay mixed to a stiff paste with three parts of lard oil and one part of kerosene will be suitable.

After the casting has been preheated

LET'S STUDY YOUR PROBLEM



Is it a New Plant?

Is it Modernization?

Is it Increased Capacity?

Is it Materials Handling?

Is it Processing?

Is it Power?

SHREVE, ANDERSON AND WALKER
Engineers and Architects
DETROIT 26, MICHIGAN

up to a point where small islands of molten metal start to form on the surface, the procedure is as previously explained for welding until the surface is covered by a thin skin of molten alloy. With the torches still playing on the surface of the die, additional molten metal is poured from a pot to the desired height. An ordinary pot and ladle such as used for melting lead or babbitt can be used for this purpose.

There is a possibility that the casting will warp during welding and recasting, particularly if a draw ring is involved, unless the component is clamped to a heavy plate or the bed of the press before commencing the process. If the section to be recast is of intricate design, much later machining can be saved and the scope of the recasting process can be broadened by employing a mold of baked core sand to impart the desired form to the section to be processed or to retain the molten alloy to a confined area.

In the aircraft industry where low volume and frequent design changes require the use of unconventional tooling, Kirksite for blanking and piercing dies plays an important role in the reduction of tool costs. Such tools have been used mainly on aluminum alloys but sufficient steel has also been processed to indicate that this development may have possibilities.

A collateral development by the Fisher Body Division which utilizes steel for low cost blanking and piercing dies is believed to be more adaptable for all-around use and, on the basis of current experience, will be found more suitable for producing sheet steel. There are at present two methods of making Kirksite blanking and piercing dies, the only difference being that in one case the die component is made from a rolled plate, and the other utilizes a casting for which the finished steel punch is used as a pattern.

A typical blanking and piercing die generally consists of seven major components including shoe for mounting the punch; punch for the blank; punches for holes; die; knockout pad; shoe for mounting the die and pierce punching; and matching plate. Of these only the die and the piercing punches are of Kirksite; the other components are of steel, excepting the knockout for which the initial production stampings from the die are used. Piercing punches in some cases are also of steel: The shoes, matching plate, and sometimes an eighth component, called a "waffle plate," are of a permanent nature and are used on various dies within a given size range. The waffle plate is a device designed to clear punch slugs and is machined in the form of a grid on the side next to the shoe where attached. Holes for locating pins, rivets and attaching screws are generally standardized on the shoes and matching plates to assure alignment. Steel bushed drill jigs are used for this purpose.

The aircraft industry has been using both natural and synthetic rubber to a great extent to cut down the cost of tooling for forming and flanging aluminum alloy panels of various sizes. A property which rubber possesses in common with liquids, namely, its ability to flow, has led to its use in place of a die in two general ways. "Free" rubber mats, laid over an operating area, can be used to start and complete a shearing, flanging or forming operation in one or more stages. "Confined" rubber, that is, a rubber mat bedded in a permanent retainer has been used in multi-press operations. Depending on the size, one or more Kirksite dies are laid on the bed of the press with corresponding blanks in position. A rubber mat in a retainer attached to the press platen then is forced down over the panels, to form or flange the parts as required.

Natural and artificial rubbers have distinct characteristics; each has its special attributes in particular applications. Therefore, a knowledge of the flow characteristics under pressure of each type is necessary before selecting the rubber to

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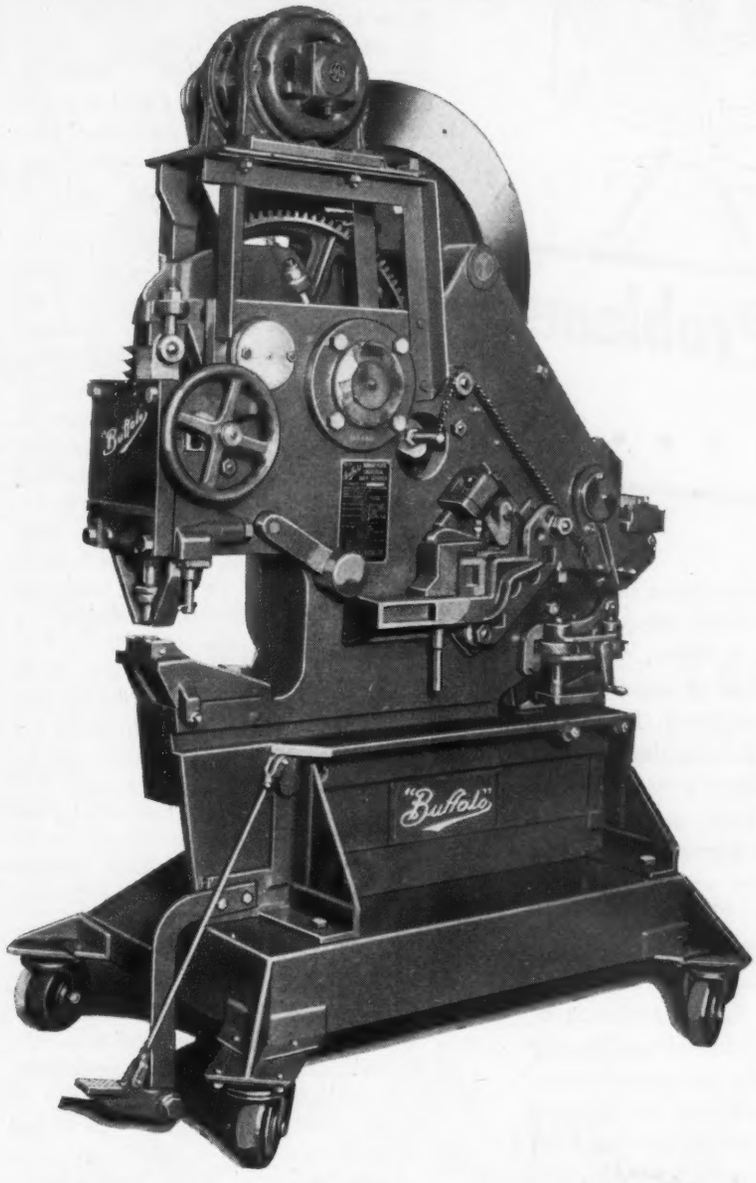

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● Railroads, shipyards, steel mills and many machine shops have an unprecedented heavy fabrication job—a job that calls for the highest order of efficiency, done by machines wherever possible.

The "Buffalo" Universal Iron Worker is doing just that—cutting, shearing, punching, coping rounds, angles, squares, beams, tees and special shapes in record time.

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On top of this, you have a movable unit. This saves added time in transporting extra heavy or cumbersome pieces for fabrication.

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Manufacturers who are striving to improve their production performance are giving material handling a lot of attention these days. They know that modern, practical handling methods are paying dividends in greater production, safety, and better employee relations. There are always many problems connected with the design and application of continuous flow handling systems, and these are often quite difficult to solve. Such problems are a headache to busy plant engineers already involved with other production details—but these same problems are the everyday work of Mathews Engineers. The Mathews people are specialists in applying *continuous flow* handling methods, and have at their command the facilities of three modern plants and the experience of nearly half a century of conveyer work in light and heavy industry. So, don't let handling problems get you down—give them to Mathews Engineers and realize the advantages that are in a conveyer service which is complete from preliminary engineering to erection in the field.

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be used and designing the die for a particular operation. The designer's problem is to form or blank the part as required, by exerting the greatest pressure at the required area point with the most suitable material, and at the same time, avoid damage to the rubber.

By using rubber as a substitute for dies, the aircraft industry has found that toolmaking procedure can be simplified by utilizing materials of organic origin for the forming and flanging punches. These include Masonite, plastic bonded plywood, plastics and hard wood. However, it is not believed these materials can be used for processing steel, nor has it been established that the rubber flow forming process in conjunciton with metallic punches is suitable for a variety of applications on steel. Enough is known, however, to indicate that rubber can be of use, to a limited extent, as a medium for "squeeze" trimming sheet steel on Kirksite dies reinforced with hardened steel cutting edges, for shallow forming and for other pressing applications.

Kirksite can be used to advantage on jigs and fixtures. It has been successfully applied to jigs and fixtures in machine shops, including drill jigs, holding fixtures, chuck jaws and others. When used for holding forgings, castings and other types of materials on milling machines, the alloy has a property of dampening vibrations that are characterized by chatter marks on the processed parts. As in the case of assembly jigs and fixtures, the casting pattern can be used to check the application, and afterward corrected for casting shrinkage, etc., if required. Another advantage is that the actual parts that are to be held in the fixture can be used as cores in the casting, thereby eliminating much fitting before the fixture is put to use.

In the operation of tube bending, forms and dies of Kirksite can be used effectively and are considerably less expensive than those of conventional materials. Several different methods of performing this work are in common use, one of which consists of a form block and grooved rotating shoe which grips the tube to be formed. Final forming is accomplished in some plants by pushing or pulling a ball through the tube to expand the walls into the contour of a Kirksite die in which it is held during the operation. Whatever the method, these tools are not only durable, but, in addition, will not scratch or gall the tube.

—o—

Workers whose eyes have been exposed to irritating vapors, liquids, dusts or chemicals now may flush their eyes immediately with the eye washing fountain, offered by Benson & Associates Inc., 332 South Michigan avenue, Chicago 4.

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UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

Tool Steel Facilities

(*Concluded from Page* 117)

as an aid in manufacturing control, rather than as an acceptance test. It is therefore usually applied to blooms and billets rather than to small bars. When properly performed it gives valuable information regarding the internal condition of the steel.

After the billets cool to room temperature and pass the acid etch test they are inspected for surface defects and conditioned by grinding. They then are either rolled or hammered to finished sizes within standard tool-steel tolerances. Subsequent treatment, including controlled cooling, holding, and annealing, as well as the various finishing operations, follows the outline given for the output from the smaller furnaces. The majority of the production from the larger electric arc furnaces is annealed and processed in equipment of the latest design located in the special steels department of the Lehigh division.

Mill Depot: Prompt and efficient delivery is an important consideration in the tool steel business. The new mill depot erected at the Bethlehem plant is designed to speed up deliveries to distributors, jobbers, and mill customers. Rapid, dependable service will also allow these to keep their own stock at a minimum and replace suddenly depleted sizes on short notice.

Standard grades and sizes of tool steels are handled through the depot, and odd grades and sizes will be shipped directly from the mills. A card record system makes it possible to determine the inventory of each item in stock at a glance, and orders for replenishment are placed as soon as the stock drops below a prescribed minimum.

Storage space is provided for tool steel in standard 10 to 12 ft lengths, and special 18 to 20 ft lengths. All grades are lacquered and painted in colors for ready identification. In addition, a record is kept of the heat number and chemical analysis for all grades.

The new depot is a one-story steel and brick structure with 60 x 360 ft floor space, of which an area 200 ft long is actual storage space, 100 ft shipping floor, and 60 ft offices and welfare rooms.

Horizontal steel racks, with 3400 compartments, provide storage space for the many grades and sizes kept in stock. Bars are handled on two specially designed battery-operated buggies equipped with a loading mechanism including catwalk and roller lines which permits the operator to place the bars in or remove them from the compartments at all levels.

A 10-ton overhead crane serves the storage area and the shipping floor. Enclosed entrances provide space for loading and unloading freight cars. Other equipment includes two cold saws with shear tables and two platform scales designed especially for this department. These scales are electrically operated and weigh loads up to 5 tons with an accuracy of plus or minus 1 lb. They are equipped with large dials which may be swung around to permit reading at a considerable distance from the loading area. Three scales of the same capacity and design were also installed in other parts of the tool steel department, one in the hammer shop, one in the finishing division, and one in the billet heat treating department.

—o—

Materials handling equipment of various types will be exhibited and demonstrated by Automatic Transportation Co., Chicago, at the Railway Supply Manufacturers Association show in Atlantic City, N. J., June 23 to 28. Included in the exhibit will be the Skylift, the hydraulic electric fork truck with automotive type controls and 130-in. lift, as well as a motorized hand truck counterpart of fork and platform lift trucks, motorized hand trucks and a Transtractor, a push-pull unit.

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ROLLING DOORS

Drilling

(*Concluded from Page 89*)

to mill the spiral flutes in the then recently perfected twist drills. Also, it is interesting to note that the twist drill embodies the original "chip disposal system"—its spiral flutes acting as "screw conveyors" to get the chip away from the cutting area.

To attempt to cover the subject of modern drilling machinery in an article of this length is as much as an impossibility as it would be to cover the subject of dogs in an article of similar length. Today there are fully as many varieties and sizes of drilling machines as there are of dogs. A story is told of one drill maker who sent to a fellow artisan a hair-like drill with a note reading, "The smallest ever made". It was returned with a manifying glass and a note calling attention to a hole drilled through the shank of the "smallest drill."

There are sensitive electrically driven machines available today which actually will drill holes of less than flyspeck diameter in steel. At the other end of the scale there are big, powerful machines with stamina and "push" to drive twist drills several inches in diameter into solid blocks of tough steel.

Years ago, drilling machines had to be redesigned and repowered to handle high speed steel drills efficiently. Many of those same machines recently have been, or now are being, redesigned and repowered to handles carbide tools. Impact of the carbides on drilling was a bit later than on some other methods of machining such as turning and boring, but all indications are that the end results will be fully as striking. Here again, the tool engineering profession with its know-how in the practical application of carbides, is a key factor.

Development of drilling machines for regular shop use has progressed along two fronts. Medium and heavy duty machines, like machine tools in general, have tended to become heavier, more rigid and more powerful, but at the same time easier to handle both as to control and as to insertion and removal of work and tools. After the introduction of the twist drills, one of the most important innovations in the tooling category has been the quick acting chuck by which drills can be changed without stopping the spindle.

The other front along which drilling technique has developed is that of the light duty, low cost machines. Built originally for "home workshop" use, these machines have been improved in quality for regular shop use, but their price has been held down through mass production methods of manufacture. Today they will be found here, there and everywhere in the finest equipped shops—wherever light drilling—say up to ½-in.—is involved. Also, components of these machines such as spindles and quills, will be found built into a wide variety of special machines involving light drilling operations, including multiple drilling. The cost of these components is so moderate that they usually are dealt with as expendable items—that is, they are replaced rather than repaired after reasonable service life.

As far as the medium and heavy duty drilling machines are concerned, their engineering improvements are second to none in the machine tool industry. When it comes to metal removal, the number of cubic inches per horsepower removed in a given length of time by a modern drilling machine will equal the performance of many other machines wherein working conditions are far more favorable than they are in the bottom of a hole. By the same token, there are multiple spindle drilling machines which top all others in the number of tools working at once, in close proximity of those tools and their interdependence.

Hydraulic feed and electrical control play important roles in the performance of many of the latest production drilling machines, as also does unit electrical drive of single spindles or groups of spindles. Without electrical control, the amazing station-to-station type drilling machines now in common use in the automotive and aircraft industries would be next to impossible. As it is, they are highly effective.

Radial drills have been so improved in power, rigidity and control that today they are used for many heavy duty production operations—even with heads at the outer reach of their arms. Their efficiency has been much improved on production work by rollover, indexing jigs and fixtures.

A recent invention which has added greatly to the possibilities of radial drills, as well as ordinary upright drills, is the precision spacing table which makes it possible to drill, ream and tap a large number of holes repetitively without the use of jigs. These tables space exactly in two directions according to a diagram of ordinates for which they are preset. They go through the entire cycle by simple operation of hydraulic controls in the sequence shown on the drawing—step-by-step spacing of the holes being entirely automatic as far as the settings are concerned. The operator merely "trips" the mechanism, so to speak. This "jigless drilling" probably is one of the most significant developments in drilling practice since the jig itself was conceived in Eli Whitney's time.

—o—

An oil filter featuring a compact replaceable cartridge with a number of perforated cellulose disks that provide a large filtering area, is announced by Youngstown Miller Co., Belleville, N. J.

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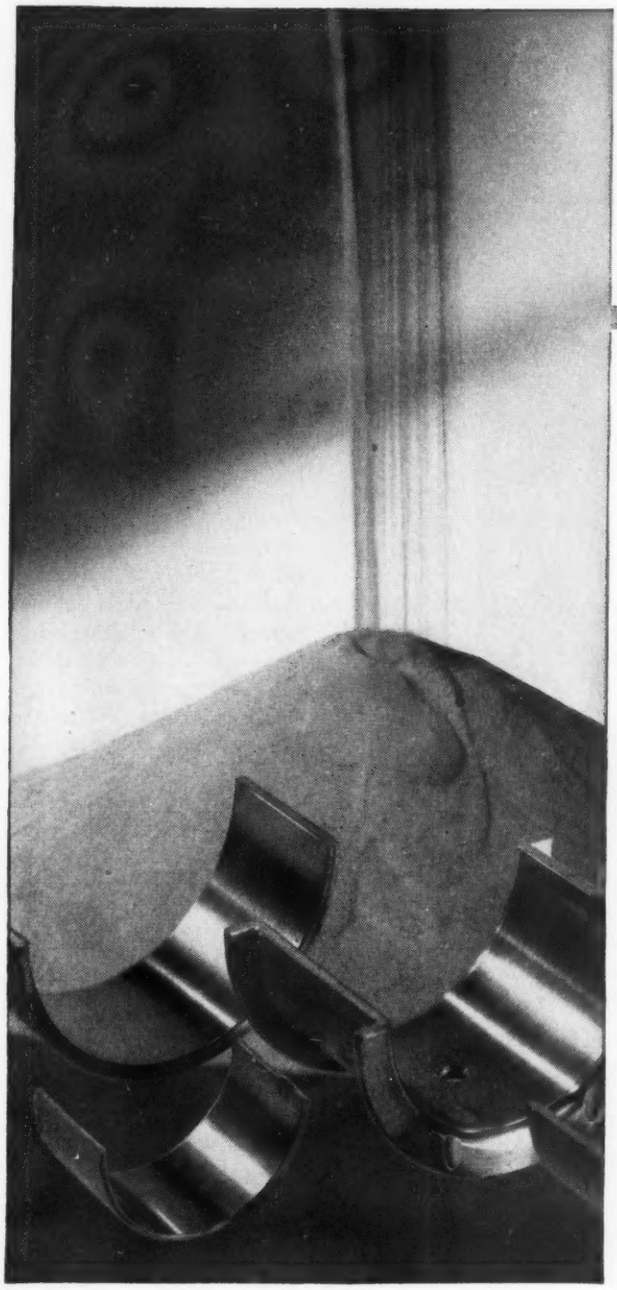

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The powder permits excellent lead distribution. Lead segregation, so common in cast types, is avoided. For this reason alloys with as high as 45% lead content are readily produced.

Overplating is generally used with the harder, lower lead content powders, such as our H-24 (24% lead). Cost of overplating is avoided with higher lead content powders, which also eliminate the need for hard crankshafts. The higher the lead content of the bearing, the softer the shaft can be.

• • •

A new technical bulletin has been published describing the development of this improved alloy. A copy will be sent free on request.

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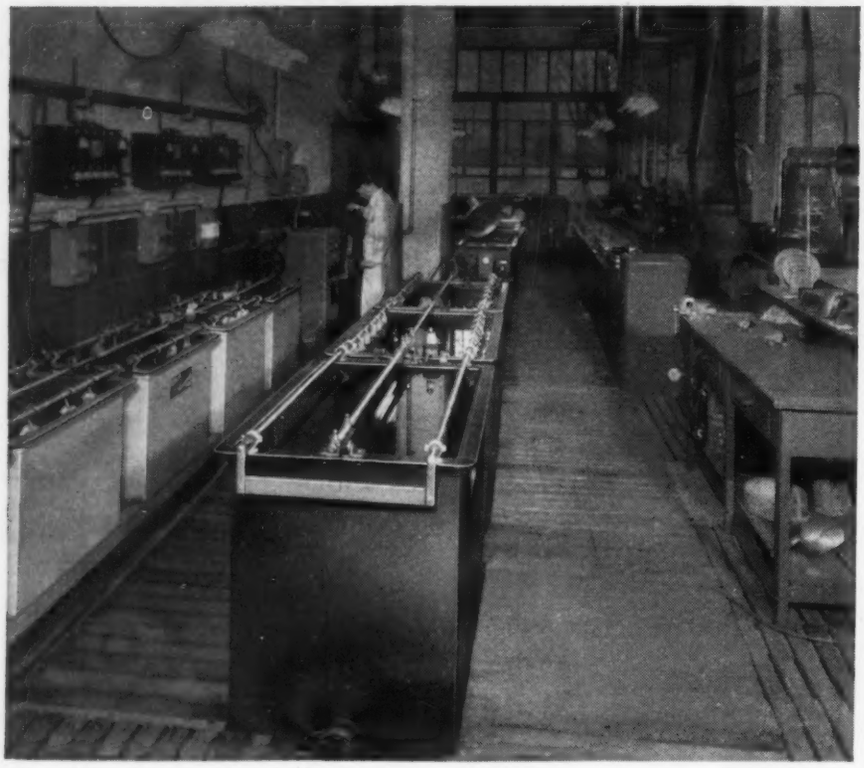

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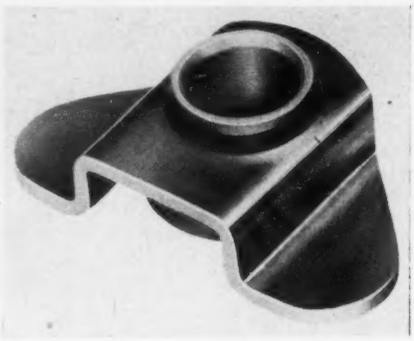
Accurate Drilling Provided By Lightweight Template

Wobble, tilt, or bell-mouthed holes are said to be eliminated by a template for precision drilling developed by Hi-Shear Rivet Tool Co., Hermosa Beach, Calif. Using anchor bushings such as the one illustrated, templates can be made to conform to any desired contour and holes drilled directly on assembly.

This method of making drill templates provides highly accurate lightweight tooling for the production of sheet metal parts. Hardened steel bushings are pressed into a low-carbon steel anchor or strap



which may be accurately located on and spot welded to thin body steel templates with complete flexibility as to hole pattern required. Since templates are readily formed and the hole pattern laid out and bushings attached, the resulting drill template may be applied directly to the work and holes drilled on assembly.

Use of the drill templates obviates the need for elaborate lofting and tool making.

Testing Bearings Subject of Booklet

Latest information on the methods used in the testing of bearings is contained in the 72-page publication "Symposium on Testing of Bearings," now available from American Society for Testing Materials, Philadelphia. Also included is information on equipment that has been developed and the correlation of laboratory tests with field service.

The five technical papers comprising the symposium are: Life testing of plain bearings for automotive engines, by E. T. Johnson, Engineering Division, Chrysler Corp.; fatigue testing machines for ball and roller bearings, by Thomas Barish; metallographic observation of ball bearing fatigue phenomena, by A. B. Jones of Engineering Department, General Motors Corp.; fatigue testing of roller bearings, by H. R. Gibbons, Hyatt Bearing Division, General Motors Corp.; and testing of bearings under controlled load, by J. M. Frankland and C. B. Innes, Chance Vought Aircraft Division of United Aircraft Corp.

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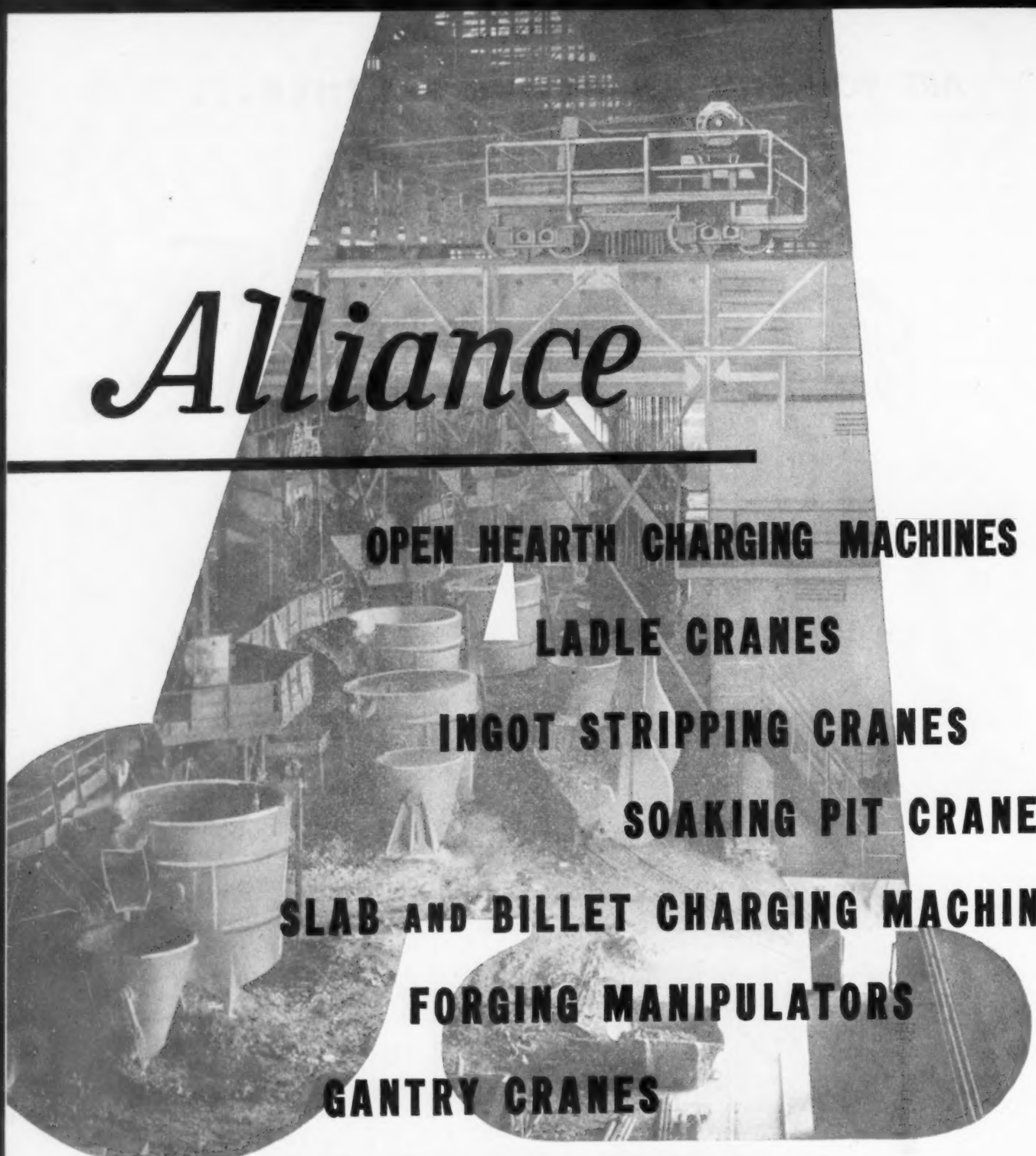

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STRUCTURAL FABRICATION

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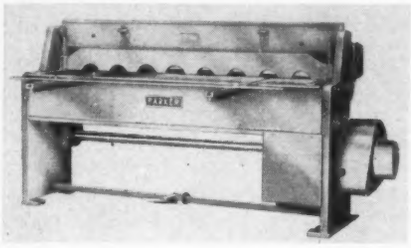
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 142

1. Squaring Shear

Built from extra heavy all steel welded plate, the new 10-gage power squaring shear made by Parker Mfg. Co., 2200 Colorado avenue, Santa Monica, Calif., has parts which are normalized after welding to relieve stresses. Bed, ram, hold down and working parts are reinforced.

Compact, box-type design with a low center of gravity for minimum vibration is a feature of shears which stand 47 in. high and weigh 4250 lb. A 5 hp motor operates the 75 in. blade with a cutting



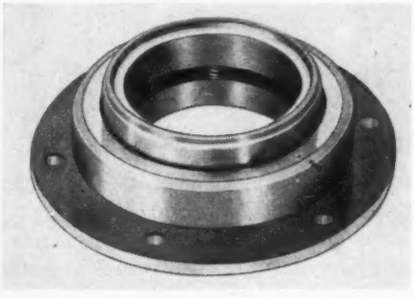
length of 73 in. at a speed of 85 strokes per min. Front and back gage ranges are 38 and 18 in., respectively. Oil hardened tool steel four-edged blades cut accurately and last longer between grinds.

2. Snap-Action Switch

Small, unhoused, skeleton type precision snap-action switches are announced by Micro Switch Corp., Freeport, Ill. Designated as SK, they are single switch units, available in normally open, normally closed or double-throw circuit arrangement. Switch element is 1 3/16-in. long.

3. Carbon Seal

A high speed carbon ring oilseal suited for use in sealing applications where oil lubrication is at a minimum, where the seal runs in a liquid other than grease

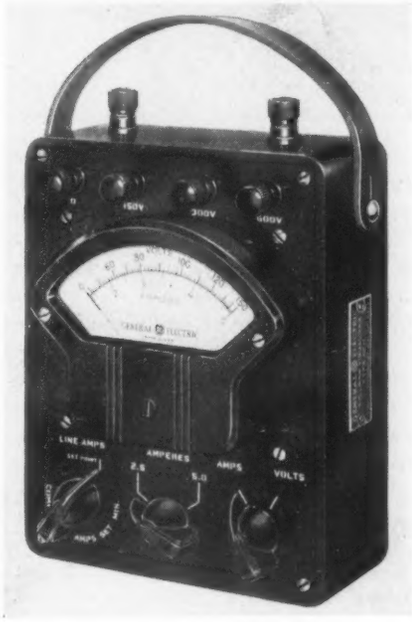


or oil or where shaft speed is greater than that satisfactorily served by other type rings, is a development of Gits Mfg. Co., 1846 South Kilbourn avenue, Chicago.

Carbon rings have a low coefficient of friction, are heat resistant, not subject to warping, chemically inert and corrosion resisting. Rings' sealing principle eliminates wear on the shaft. A seal against leakage of liquids or gases under pressure or vacuum is effected by a radial seal joint made by contact between a stationary lapped seal surface built into the seal unit and a rotary lapped seal surface.

4. Load Visualizer

A light weight alternating current analyzer for use on single phase and balanced polyphase systems is announced by General Electric Co., Schenectady,

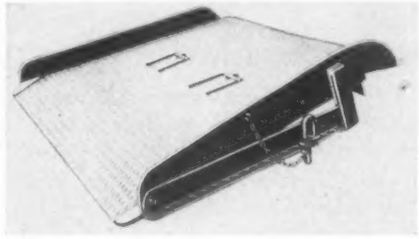


N. Y. Besides serving as a standard 0-2.5/5 amp ammeter and a 0-150/300/600 v voltmeter, this load visualizer may be used with the calculator furnished to determine watts, vars, volt-amperes, and power factor for load surveys, induction motor tests, reactive-power studies and power factor checks on power and lighting circuits.

Instrument has an iron vane moving element and separate field winding for voltage and current. Operation is controlled by three selector knobs placed at the end opposite the connection terminals. Designated as the AF-1, it is mounted in a greaseproof case and is magnetically damped, fully shielded and equipped with an external zero set.

5. Bridge Ramp

Designed for use with fork trucks on railroad sidings, the One-Man bridge ramp, manufactured by Elizabeth Iron Works, P. O. Box 360, Elizabeth B, N. J., has a load capacity of 15,000 lb and

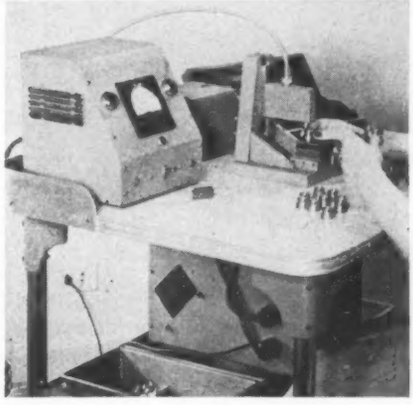


may be placed and secured by one person in less than 2 min. Transported to location between platform and freight car or between cars, it is set in place and the truck's forks withdrawn. Lift handles drop flush with riding surface.

Ramps are made to span gaps from 5 to 58 in., with heights up to 7 in. Riding surface is nonslip steel plate reinforced with shock plates at corners. Side stringers add rigidity and act as a safety guard. Locking pins hold it in place while in use.

6. Electronic Segregator

Model DS-20 selector, announced by DoAll Co., Des Plaines, Ill., is an electronic segregator for the automatic sort-



ing of small parts into three classifications; oversize, acceptable and undersize. Accurate to 0.00001-in., it will sort parts with tolerances from plus or

minus 0.0001-in. to plus or minus 0.005-in. at speeds up to 12,000 parts per hour.

Set by gage blocks, selector consists of three units, the gage head, master control and segregator. Actual measurement is done by the head which is designed so as to have no parts which might need adjustment. Speed of operation is limited only by rate at which parts may be fed into the instrument. Automatic and semiautomatic feed mechanisms are available.

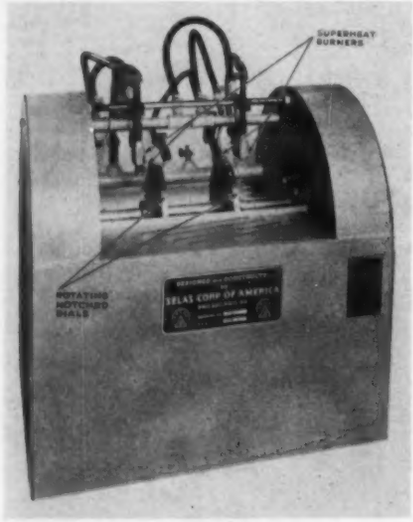
Gage head stand, table and chair and tote pans are furnished with selector. Besides red and green indicating lights, master control unit has a graduated indicating dial gage providing visible readings of size of each part being sorted. Electric counter and a hearing aid which makes possible operation by a blind person are also available.

7. Conveyor Belt Cleat

Development of a curved cleat which cannot be pulled loose regardless of conveyor belt condition is announced by Rapids-Standard Co. Inc., Grand Rapids, Mich. Standard equipment on the company's Press-Veyor, it is formed from 12-gage steel and fastened with round head bolts, lock nuts and a steel reinforcing strip. Cleat projects 1½ to 2 in. above belt.

8. Heat Treating Unit

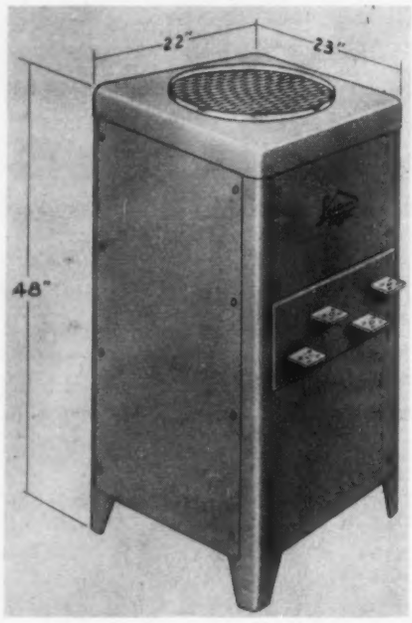
Automatic gas fired machines for heat treatment of fragile assemblies weighing as little as a few ounces have been designed by Selas Corp. of America, Philadelphia 34. Machine illustrated is hardening eyelets and annealing weldments on magnetic pull wires used in business machines. Both steps are effected simultaneously.



Assemblies are placed on a rotating drum and eyelets are heated to hardening temperature by a set of staggered high heat burners and quenched by a water spray attached to the side of the burner. A second set of burners anneals the weld and applies cooling water to the hardened eyelets so they will not be annealed. Production rate is approximately 1200 pieces per hour.

9. Plating Rectifier

Designed to deliver 1500 amp current at 6 v or 750 amp current at 12 v, the new 550-lb portable rectifier unit for electroplating power, made by Electronic Rectifiers Inc., 737 North East street, Indianapolis 2, is self-contained, requiring no foundation and eliminating bus bar connecting systems.



Only moving part of unit is the blower fan. Air draft moves upward past the rectifier cooling fins and exhausts at top of cabinet. It may be equipped with a diverter to direct heated air wherever desired.

10. Rust Remover

Effective on any metal surface, a rust remover that will remove the thickest coat of rust, even penetrating into pin point spots, crevices, cracks and corners, is introduced by Allied Products Co., 1133 West Newport street, Chicago. Called CorOdex, it requires no rubbing, is nonexplosive and noninflammable, and will not injure metal or the hands of the user.

11. Stripping Compound

Carbon, paint, varnish, adhesive dirt, oil and grease may be stripped thoroughly through use of a new, noninflammable cold tank cleaner, Turco Transpo, manufactured by Turco Products Inc., 6135 South Central avenue, Los Angeles 1. Most effective when used between 65 and 85° F, the virtually odorless cleaner is noncorrosive to aluminum, magnesium, cadmium plate, steel, zinc, cast iron and tin plate.

12. Name Stamping Machine

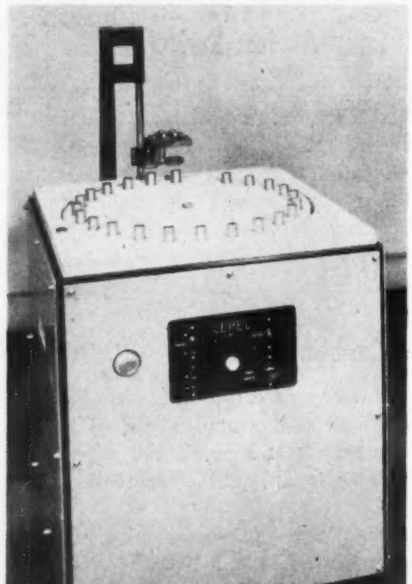
Name plate stamping machine model 1F, made by Acromark Co., 398 Morrell street, Elizabeth 4, N. J., has a new clutch construction which incorporates a lever operated movement controlled by a knurled thumb screw. Adjustment of stroke is by means of a wing nut. Operator sets character advance to suit any size character by one adjustment.

13. Clamped-In Tools

Successful on multiple set-ups, a new line of tools with clamped-in Kennametal blades manufactured by Kennametal Inc., Latrobe, Pa., are for single grooving or cutting off operations of light alloys, bronze and cast iron. Tungsten carbide blades are clamped in holders, designated as styles RG and LG for right and left hand use. Five sizes are available, each accommodating various blade thicknesses.

14. Indexing Table

An indexing table for soldering, brazing and annealing of round or irregularly-shaped small parts is announced by Lepel High Frequency Laboratories Inc., 39 West 60th street, New York 23. As parts on the table are moved or indexed into heating position, the load coil lowers to surround each part. This is followed by a heating cycle, all operations being performed automatically.



Length of heating cycle may be varied to meet various requirements, and index speed is adjusted by a variable speed

drive. Travel of load coil is normally 3½-in. but may be changed to meet other requirements. Unit may be used with any Lepel high frequency converter or other high frequency generator. It is equipped with built-in automatic timer which controls heating time.

15. Refractories Gun

Designed to apply air-emplaced refractories speedily and to accomplish certain types of steel furnace repairs in a fraction of the time formerly taken, the newly-designed refractories gun de-

veloped by Basic Refractories Inc., Cleveland, is equipped with a pressure hopper holding 500 lb of refractory.

Refractory materials, which may be applied to vertical and semivertical brick walls with the machine, weigh 140 lb per cubic foot. Machine has a discharge capacity of more than 100 lb per min. It automatically wets the refractory shortly before the point of discharge.

16. Light Gage Welding Electrode

Announcement of a new welding electrode for light gage welding of sheet metal is made by A. O. Smith Corp., Milwaukee. The high speed, heavily-coated electrode welds with minimum build-up, and produces a bead contour that requires little finish grinding. Welding characteristics guard against bead sagging and burning through.

17. White Print Finisher

Developed for processing ammonia type diazo white prints, the A finisher, made by Paragon-Revolute Corp., 77 South avenue, Rochester 4, N. Y., has a diaphragm pump for pumping aqueous ammonia to the vaporizing tray. Other features include perforated stainless steel rollers, interval timer for temperature control, single switch control and fast speed.

Various combinations of temperature and ammonia vapor strength are offered in the machine. Ammonia vapor is gener-

ated in a stainless steel tank. With no relative motion between the belt, sensitized material and rollers, thin papers or film may be handled without sticking or scratching. Speed is fixed at 15 fpm. Drive is by a ¼-hp motor operating through a gear reduction box. Ventilation is provided by a ¼-hp motor and squirrel cage blower. Neoprene belt conveys prints through the machine.

18. Carbon Dioxide Hose Rack

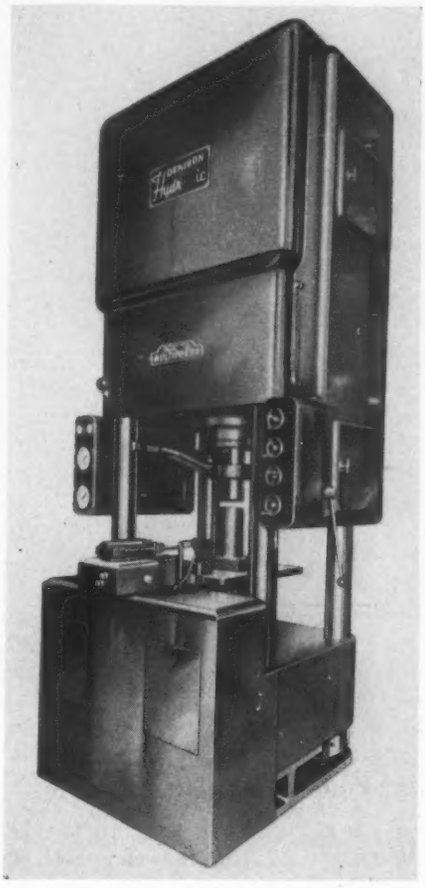
A feature of the carbon dioxide hose rack announced by C-O-Two Fire Equipment Co., Box 390, Newark 1, N. J., is that it may be used as a fixed hose rack, or it may be picked up and carried to a fire. Cylinder bracketing is permanently fastened to a wall and clamps permit easy removal from fixed position. It contains 50 lb of carbon dioxide and is fitted with 25 ft of ½-in. high pressure hose terminating in a discharge horn. Entire unit weighs 240 lb.

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 142.

19. 75-Ton Press

Featuring vibratory control which offers a wide range of ram actions and controls, the 75-ton Multipress manufactured by Denison Engineering Co., 1160 Dublin road, Columbus 16, O., allows a choice of three valve combinations. By making several valves optional, this four strain rod press will meet practically every pressing cycle need within a 75-ton range.

Among its operating characteristics are automatic or manual ram cycling, fast traverse—slow pressing speed, pressure



and distance reversal, low ram tonnage if desired with high return and accessory pressures and large tooling area. One man may operate the press, which has a 30 in. daylight opening and an 18 in. stroke. Adjustments give the press a pressure variance of from 7½ to 75 tons.

20. Coating Oven

Young Brothers Co., Detroit 7, is introducing a new continuous conveyor coating and lithographing oven which features zone temperature control, recirculation of air without use of restricting external duct work and a recuperating zone which recovers stored heat in the metal sheets and injects it back into the baking zone. This recuperative cooling system, operating in an oven handling 3500 sheets per hour and at a baking temperature of 400° F results in the recovery of approximately 30 per cent of the total Btu.

Burners within the oven proper are located so danger of overheating of sheets, due to direct radiation, is eliminated. Zone control of heat allows gradation to provide the ideal temperature required in each phase of the drying and oxidation

of the coating or of the ink.

Oven is manufactured in various lengths, dimensions being determined by production requirements.

21. Gage Handle

Vis-U-Trol transparent gage handle, manufactured by Industrial Development Associates Inc., 223 Spruce street, Bloomfield, N. J., enable a history of the gage to be maintained, remaining with the gage. Handle consists of a lucite tube in which are inserted steel gage ends. One grooved and one ungrooved end distinguishes between go and no go ends. Handles are made in three sizes.

22. Welding Electrode

Welding of low alloy cast steel or low alloy high tensile strength rolled steels in flat position is possible with the DH-MO electrode, available in four diameters from Westinghouse Electric Corp., Pittsburgh 30. Designed for high speed welding of grooved joints, positioned fillets and horizontal fillets, welds can be made with alternating current or direct current straight polarity.

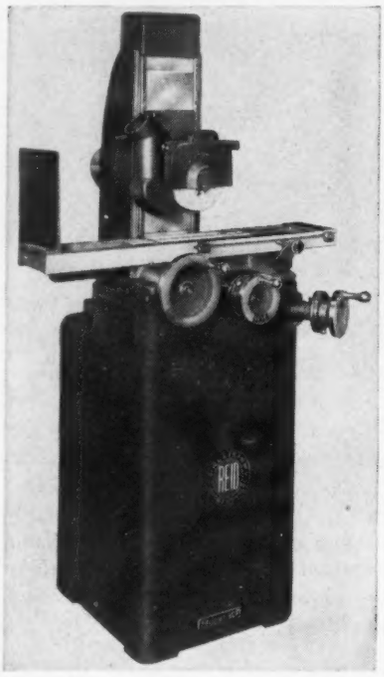
23. Broaching Machine

Two jobs may be set up at one time and either used, reducing setup time on the 36 in. hydraulic broaching machine available from Zagar Tool Inc., 23880 Lakeland boulevard, Cleveland 17. Machine has extremely slow ram speeds without loss of pulling power. Return stroke is constantly fast.

Pulling power equals 16,000 lb. Controls grouped on recessed instrument panel permit hairline selection of speeds. Double cylinders spread pulling stress. Machines are equipped with 220/440 v, 3-phase, 60 cycle motor, wired to suit available current.

24. Surface Grinder

Close tolerances and fine finishes on tools, gages, dies, chasers, etc., may be obtained with the model 48 hand feed precision surface grinder built by Reid

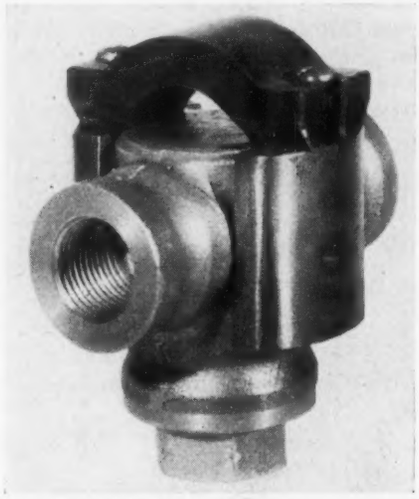


Bros. Co. Inc., Beverly, Mass. Machine grinds work 4 x 8 x 9⅛-in. high from the work table. It elevates 12⅝-in. from work table to center of spindle.

Elevating hand wheel is graduated in 0.0005-in. while cross feed hand wheel is graduated to 0.001-in. Adjustable graduated index dials on hand wheels allow the return to zero on graduations, eliminating the marking of wheels or figuring on paper. Lubrication is through Zerk fittings and oil cups.

25. Magnetic Screen Trap

Both magnetic and nonmagnetic materials from oils, gasoline, air and gas is removed by a new magnetic screen trap announced by Cooney Valve &



Screen Co., P.O. Box 1358, Erie, Pa. Incorporating a mesh screen and a powerful Eriez alnico permanent magnet built into a single, compact unit, the trap allows maximum flow of material with a minimum drop in pressure.

Body of the trap is of brass, bronze or aluminum. No braces or supports are included on the screen, thus offering a clear filtering area. It is a unit separable from the screw cap to facilitate cleaning, renewal or change or wire mesh. Permanent magnets require no wiring, deriving their power from the alnico magnetic unit.

26. Air Cylinder

Noncushion type air cylinders, with threaded cylinder caps of heat treated aluminum alloy, are introduced by Modernair Corp., 4222 Hollis street, Oakland 8, Calif. Caps can be rotated 360 degrees without breaking seal. Cylinder is produced in standard range of 2, 2½, 3 and 4 in. diameters, stroke length being optional. Several types of mounting brackets also are available.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Helpful Literature

43. Screws

Standard Pressed Steel Co.—16-page illustrated bulletin form No. 610 contains descriptions, specifications and information on uses of Unbrako socket screws, socket head cap screws, self-locking screws, flat head socket cap screws, hollow set screws, socket head stripper bolts, keys and special items. Prices are included.

44. Grinding Machines

Sheffield Corp.—Two 2-page illustrated machine tool data sheets, TFG No. 123 describes Micro-Form grinder Crushtruing tool of specific dimensions and TFG No. 124 describes precision grinders. Former data sheet is case study of operation.

45. Blowers

Roots-Connersville Blower Corp.—8-page illustrated bulletin No. 23-120-B10 covers various types of equipment for use in sewage disposal plants and water works. Numerous rotary positive and centrifugal blower installations in typical plants are shown. Other applications are covered also.

46. Materials Scoop

Mixermobile Manufacturers — 8-page illustrated folder presents improved Scoopmobile which is pneumatic-tired, wheeled vehicle for earth and bulk materials handling. It can be converted readily for handling other types of materials also. Unit is completely described and features outlined. Insert sheet describes Wagner truck crane.

47. Stamping Manufacturers

Pressed Metal Institute—Third edition of "The Blue Book of Stamping Manufacturers" contains alphabetical list of institute members, geographical breakdown of their plants and stamping facilities of companies.

48. Flexible Gear Couplings

Couplings, Inc. — 16-page illustrated catalog No. A2 presents ratings, applications and diagrams of Knebar couplings for use in power transmission drives, marine drives, dynamometer transmissions, helicopter drives and aircraft transmissions.

49. Electrical Diagrams

General Electric Co.—24-page illustrated bulletin No. GET-1293 describes purpose and use of electrical diagrams supplied with company's switchgear equipment. Illustration of each type of diagram is included and glossary of terms is provided to supplement description of objects achieved by each of diagrams.

50. X-Ray Diffraction

North American Philips Co.—6-page illustrated folder No. R1063 is entitled "Industrial Control with X-Ray Diffraction" explains principles of X-ray diffraction and how it operates in industrial applications. Typical film is shown and explained. Geiger-counter X-ray spectrometer is discussed in connection with quantitative analysis work.

51. Circular Sawing Machine

Motch & Merryweather Machinery Co.—12-page illustrated bulletin describes No. 00 circular sawing machine for cutting ¼ to 2-inch stock. Features are described. Larger machines in line are described also.

52. Steel Hand Trucks

Rapids-Standard Co.—2-page illustrated bulletin No. WE-24P presents information on line of Wheel-Ezy steel hand trucks of single and double-handled models. Specifications list five different types of wheels available for two types of models.

53. Toolmaker's Lathe

Monarch Machine Tool Co.—24-page illustrated bulletin No. 302 covers design and construction features of 10-inch sensitive precision model EE toolmaker's lathe. Electrical and mechanical details and specifications are included.

54. Adjustable-Speed Drive

Reliance Electric & Engineering Co.—Two 4-page illustrated bulletins, Nos. 311 and 311-A describe all-electric adjustable-speed drive for alternating current circuits. Available in sizes from 40 to 200 horsepower, system operates from plant's alternating current power and provides centralized control.

55. Powder Power Tool

Meco Inc.—6-page illustrated folder describes Drive-It powder power tool which exerts from 15 to 75-ton blow for hole punching in steel, concrete and other materials. Complete description of gun is given and methods of handling are outlined.

56. Adjustable V-Belt Drives

Manheim Mfg. & Belting Co.—24-page illustrated catalog describes features of adjustable Veelos V-belts, gives construction details, and illustrates method of coupling and uncoupling, measuring and installing. Engineering data and application photos are included.

57. Resistance Welding

Sciaky Bros. Inc—4-page illustrated bulletin No. 137-A describes three-phase resistance welding, points out its features and advantages and describes briefly three types of three-phase welders for projection, spot, roll spot and seam welding.

58. Vibration Isolators

Lord Mfg. Co.—Illustrated bulletin No. 106 presents new Multiplane mounting which isolates vibration from instruments, electronic equipment and other highly sensitive equipment. Unit is light in weight and functions regardless of direction of disturbing forces.

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59. Rehandling Buckets

Hayward Co.—8-page illustrated bulletin No. 697 describes lightweight E-16 rehandling clam shell bucket for handling sand, gravel, crushed stone, cement clinker and other bulk materials. It can be adapted for excavating and dredging. Chart lists bucket load capacities, weights and dimensions and recommended wire rope diameters, reeving and closing lengths.

60. Scrap Cutter

Haller Machine & Mfg. Co.—Illustrated bulletin describes model D-611 scrap cutter which is compact, ram driven unit that can be used on almost any punch press. Construction features are covered in detail and specifications are given.

61. Steam Hammers

Erie Foundry Co.—12-page illustrated bulletin No. 345 presents information on history, development and use of steam hammers. Advantages, design, construction and specification details are covered. Proper selection of hammer size is discussed.

62. Vibration Inducing Unit

Testing Equipment Dept., Eddystone Div., Baldwin Locomotive Works—Illustrated bulletin No. 266 describes Baldwin Lazan oscillator, a compact, portable machine for inducing controlled vibrations in structures and assemblies.

63. Feed Fingers & Pads

Hardinge Brothers, Inc.—8-page illustrated bulletin No. 11154615 covers style B master feed fingers and pads, gives style, size and price data for standard machines and cites ten advantages of design.

64. Conveyor Belts

B. F. Goodrich Co.—4-page illustrated catalog section No. 2220 presents information relative to various lines of conveyor belts designed for specific services. Details of each brand, special constructions available in various belts as well as list of applications are included.

65. Strapping Tools

A. J. Gerrard & Co.—4-page illustrated folder "Bulkbinder" describes line of heavy duty strapping tools and accessory equipment. Units feature strap cut-off device and replaceable gripper insert.

66. Materials Handling

Towmotor Corp.—Illustrated survey report presents data on use of fork lift trucks in glass plant with production volume sufficient to fill 50 box cars and 20 trailer trucks per day.

67. Injection Molding Machines

Hydraulic Press Mfg. Co.—4-page illustrated folder describes 4, 9, 16 and 32-ounce injection molding machines. Features are covered.

68. Abrasive Products

Gardner Machine Co.—24-page illustrated booklet "Gardner Abrasive Products" covers complete line of products ranging from heavy duty Wire-Lokt abrasive wheels, with 1, 2 or 3 inches of usable abrasive, down to ¼-inch thick G.L.A. disk. Three-M-ite glue bond disks and wheel dressers are also included.

69. Oil Circuit Breakers

Allis-Chalmers Mfg. Co.—4-page illustrated No. 71B6179B describes type DZ-40B oil circuit breakers of moderate capacity for indoor service. Units are available for electrical or manual remote control and are of oiltight, enclosed mechanism type with all three poles in single tank.

70. Vaporizer

John E. Mitchell Co.—8-page illustrated filable bulletin presents information on Mitchell vaporizer for domestic, industrial and automotive applications using liquefied petroleum gases. Equipment can be used with tanks either above or below ground. Features, advantages of use and typical diagrams of installations are shown.

71. Refractory Material

Ironton Fire Brick Co.—4-page illustrated bulletin presents information about Ironton Berlite, special purpose refractory material for cupolas, foundry ladles, metal mixers, transfer cars and open hearth runners. High refractoriness, lack of shrinkage, workability, strength, resistance to slag erosion, and elimination of peeling and bloating are features of this material.

72. Abrasive Blast Cleaning

American Wheelabrator & Equipment Corp.—Series of illustrated booklets describes application of Wheelabrator airless blast cleaning equipment to gray iron, steel, malleable and nonferrous foundries and heat treating and forge shops. Case histories of installations are given.

73. Lubrication Systems

Farval Corp.—8-page illustrated bulletin "Studies in Centralized Lubrication" covers six case studies in which lubrication system has saved time, money and replacement parts. System delivers oil or grease under pressure to group of bearings, etc., from one central station in exact quantities as often as desired.

74. Heat Exchangers

Duriron Co.—4-page illustrated bulletin No. 1603 describes line of heat exchangers designed for use in corrosive liquids. Corrosion resistance, advantages, typical applications and diagrammed installations are presented.

75. Selenium Rectifiers

Richardson-Allen Corp.—Two 2-page illustrated catalog sheets cover new automatic electronic voltage regulator and general line of all-purpose industrial rectifiers adaptable for all types of current rectification from alternating to direct current for industrial uses.

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Readers' Service Dept.

Coal Strike Threat Exerts Influence on Steel Demand

Some buyers pressing for shipments in anticipation of steel production curtailment. Seasonal factors, such as vacation suspensions, also figure in current market situation. Scrap prices rise as buying revives

THREATENED nation-wide bituminous coal strike next month, and vacation shutdowns of many manufacturing plants are having a mixed effect on steel demand.

While many consumers are pressing for shipments before June 30 in an effort to build stocks as protection against possible curtailment of steel production in event of a coal strike, many others, less concerned over the outlook, are requesting the steel mills hold up shipments during their plant vacation periods. General net effect of this situation is a slightly downward trend in demand although overall requirements continue well in excess of current supply.

As midyear approaches signs are increasing of closer demand-supply balance in many products. This is true even in the flat-rolled items which have been in tightest position. Sheets and strip are being produced in record-breaking volume and while supply falls short of requirements, inventories are improving in some major consuming lines. However, the threatened coal strike is serving to spur buyers' requests for shipments so that overall demand pressure is unabated.

In other areas of the market easing of pressure on the mills is noted. Uncertainty over labor and material costs is causing builders to move slowly in ordering structural shapes, and some mills, consequently, have been able to reduce order backlogs. Plates are in strong demand but inquiry appears less pressing, due partly to seasonal influences such as vacation suspensions. Producers of carbon bars are booked up for third quarter, except in larger sizes, but demand shows signs of easing, some sellers being fairly well caught up on commitments.

With pig iron subsidies for the housing program expiring June 30, sellers are pressing merchant iron production with the result shipments of steelmaking iron may suffer to some extent. Incidentally, expiration of the subsidies raises the question as to the future price trend on merchant iron in view of the likelihood of continued tight supply for some time to come.

Substantial scrap buying movement appears under way with a number of the steel mills which had been out of the market for six weeks or more again acquiring tonnage. Some of the new ordering is in anticipation of a coal strike in event of which larger scrap charges in furnace melts would be necessary to offset curtailed pig iron production. While buying has not attained major proportions as yet, prices are definitely higher confirming the stronger tone of the past three weeks. At Pittsburgh heavy melting scrap has advanced $2.50 per ton to $32.50, while up to $35 per ton has been done at Youngstown. Higher levels are also quoted at Detroit and in the East.

Steel production set a peacetime record in May, totaling 7,332,828 net tons. Production in the first five months of the year was 35,318,435 net tons, gain of 14 million over the like 1946 period. Continuance of the rate of the first five months over the remainder of the year would result in 1947 production topping 85 million tons.

For the 23rd consecutive week, steelmaking operations were above 90 per cent last week, the estimated national ingot rate holding unchanged at 96.5 per cent. A 1 point rise in the Pittsburgh rate to 102.5 per cent was offset by declines of 4½ points in Cleveland to 91½ per cent, 3 points in New England to 92, 1 point in Chicago to 95, and 1 point in Detroit to 89 per cent. Elsewhere operations were unchanged.

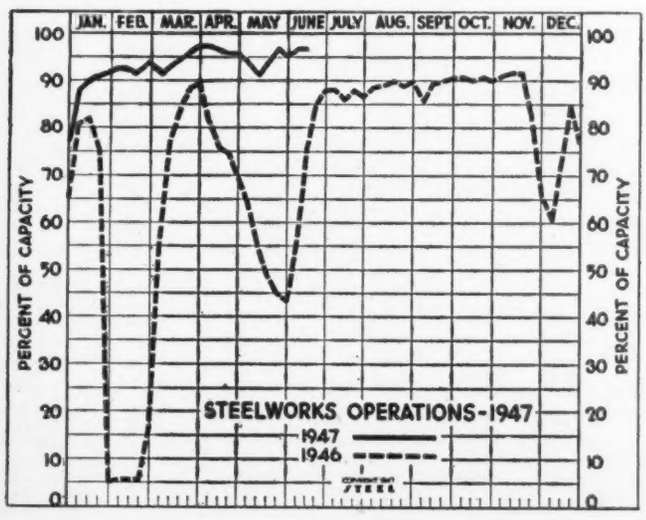
For the third successive week, STEEL's composite price average on steelmaking scrap advanced, rising to $31.25 from $30.08 the previous week. Other composite market averages held unchanged at $69.82 for finished steel, $52.10 for semifinished steel, and $32.49 for steelmaking pig iron.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended June 14	Change	Same Week 1946	Same Week 1945
Pittsburgh	102.5	+ 1	69.5	85
Chicago	95	— 1	79	95
Eastern Pa.	93	None	81	91
Youngstown	93	None	42	91
Wheeling	89	None	79	86.5
Cleveland	91.5	— 4.5	85.5	93
Buffalo	88.5	None	86	90.5
Birmingham	99	None	95	26
New England	92	— 3	80	86
Cincinnati	85	None	87	60
St. Louis	82	None	54.5	75
Detroit	89	— 1	86	66
Estimated national rate	96.5	None	75	88

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.



COMPOSITE MARKET AVERAGES

	June 14	June 7	May 31	One Month Ago May, 1947	Three Months Ago Mar., 1947	One Year Ago June, 1946	Five Years Ago June, 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$69.82	$64.09	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	52.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	32.49	32.40	27.50	23.00
Steelmaking Scrap	31.25	30.08	29.92	29.75	37.25	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	June 14, 1947	May, 1947	Mar., 1947	June, 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.98	2.82
Steel bars, Chicago	2.60	2.60	2.60	2.50
Shapes, Pittsburgh	2.50	2.50	2.50	2.35
Shapes, Philadelphia	2.64	2.64	2.64	2.465
Shapes, Chicago	2.50	2.50	2.50	2.35
Plates, Pittsburgh	2.65	2.65	2.65	2.50
Plates, Philadelphia	2.85	2.85	2.85	2.55
Plates, Chicago	2.65	2.65	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05
Hot-rolled strip, Pittsburgh	2.50	2.50	2.50	2.35
Cold-rolled strip, Pittsburgh	3.20	3.20	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05
Wire nails, Pittsburgh	4.125	4.125	4.125	3.50
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	42.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	42.00	39.00
Wire rods $\frac{5}{16}$ to $\frac{1}{4}$-inch, Pitts.	2.55c	2.55c	2.55c	‡2.30c

‡ Base, No. 5 to $\frac{5}{8}$-in.

Pig Iron

	June 14, 1947	May, 1947	Mar., 1947	June, 1946
Bessemer, del., Pittsburgh	$34.83	$34.83	$34.83	$29.69
Basic, Valley	33.00	33.00	33.00	28.00
Basic, eastern del. Philadelphia	35.52	35.52	34.26	27.84
No. 2 fdry., del. Pgh. N. & S. sides	34.33	34.33	34.33	29.19
No. 2 fdry., del. Philadelphia	36.02	36.02	34.76	28.34
No. 2 foundry, Chicago	33.00	33.00	33.00	28.50
Southern No. 2 Birmingham	29.88	29.88	29.28	22.88
Southern No. 2, del. Cincinnati	34.75	34.75	34.15	26.94
Malleable, Valley	33.50	33.50	33.50	28.50
Malleable, Chicago	33.50	33.50	33.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	40.50	40.50	40.50	33.00
Gray forge, del. McKees Rocks, Pa.	33.66	33.66	33.66	28.55
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.25	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$32.50	$30.00	$37.25	$20.00
Heavy melt. steel, No. 2, E. Pa.	31.50	28.35	38.50	18.75
Heavy melt. steel, Chicago	29.00	29.25	35.125	18.75
Rails for rerolling, Chicago	34.00	34.50	40.75	22.25
No. 1 cast, Chicago	35.50	36.90	43.25	20.00

Coke

Connellsville, furnace ovens	$9.125	$9.125	$8.875	$8.75
Connellsville, foundry ovens	10.625	10.375	10.375	9.50
Chicago, by-product fdry., del.	16.10	16.10	16.10	13.75

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown. **Alloy Steel Ingots:** Pittsburgh, Canton, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich., $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, $\frac{5}{16}$ to $\frac{1}{4}$-in., inclusive $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base, del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c; San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-†6.70c; double refined, 7.00-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co., quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.325c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, corrugated: Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.945c.

Aluminized Sheets, No. 20: Hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.30c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c. Dynamo: Pittsburgh, 6.45c; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)
Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del. 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)
Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; over 0.80 to 1.00, 6.80c; over 1.00, 9.10c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.
Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 3.85c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)
Floor Plates: Pittsburgh, Chicago, 3.90c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.
Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Phila., del., 2.64c; Geneva, Utah (base, del), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)
Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).
Wire to Manufacturers in carloads
Bright, basic or bessemer.....*$3.30–$3.55
Spring (except Birmingham).....**$4.25
Wire Products to Trade
Nails and Staples
Standard and cement-coated.....†$3.75–$4.50
Galvanized .....‡$3.75–$4.50
Wire, Merchant Quality
Annealed (6 to 8 base) ..... §$3.95
Galvanized (6 to 8 base)..... §$4.40
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier.... ††84
Barbed wire, 80-rod spool..... ††94
Barbless wire, twisted..... 94
Fence posts (no clamps)..... ††90
Bale ties, single loop..... ††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.

** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.05, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

§ Worcester $4.05, annealed; $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.

†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), Williamsport, Pa., $3.20, Pittsburgh, 2.85. Relaying, 60 lb and over fob warehouse $45-$47 per net ton.
Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

Steel			Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	48	23	¼	— 2	+20
¼ & ⅜	51	30½	⅜	—11½	+10
½	55½	41	½	—17	+ 2
¾	58½	45	¾	—22½	— 1½
1-3	60½	47½	1	—23	— 2
			1¼	— 1	+20
			1½	— 7	+13
			2	—14½	+ 5½
			2½-3½	—17	+ 1½
			4	—21	— 4
			4½-8	—19	— 2½
			9-12	—10	+ 7

Lap Weld

Steel			Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
2	53	39½	1¼	— 1	+20
2½-3	56	42½	1½	— 7	+13
3½-6	58	44½	2	—14½	+ 5½
*8	58	42½	2½-3½	—17	+ 1½
*10	57½	42	4	—21	— 4
*12	56½	41	4½-8	—19	— 2½
			9-12	—10	+ 7

* Not T. & C.

Seamless
Steel

In.	Blk.	Gal	In.	Blk.	Gal
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Elec. Weld— Hot Rolled	Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	55 off
⅝ and ¾, up to 6 in. in length.....	52 off
¾ x 6 in.	49 off
⅞ and 1 in. x 6 in. length.....	51 off
1¼ in. and larger in all lengths and ⅞ in. and larger in lengths over 6 in. ..	48 off
½ in. and smaller, longer than 6 in. ...	45 off
Tire bolts	38½ off
Step bolts	46 off
Plow bolts	57 off

Stove Bolts

In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller.....	51 off	.....
½-in. and smaller.....	.....	48 off
½-in.-1-in.	48 off	.....
⅝-in.-1-in.	.....	47 off
1⅛-in.-1½-in.	46 off	45 off
1⅝-in. and larger.....	.....	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright).....	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞, & 1 x 6.....	47 off

Square Head Set Screws

Upset 1-in. and smaller.....	61 off
Headless, ¼-in. and larger.....	46 off
No. 10 and smaller.....	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
7/16-in. and under.....55-5 off
Lebanon, Pa. .....55-5 off plus 15c per cwt.	

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per bbl; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	74.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	62.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A ..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

PIG IRON

Prices per gross ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†**Neville Island, Pa.,** base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. Sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	35.00	36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base).....$40.50
6.51-7.00..$41.50 9.01- 9.50. 46.50
7.01-7.50.. 42.50 9.51-10.00. 47.50
7.51-8.00.. 43.50 10.01-10.50. 48.50
8.01-8.50.. 44.50 10.51-11.00. 49.50
8.51-9.00.. 45.50 11.01-11.50. 50.50

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $65.75, Jackson, O.; $67, Niagara Falls; $68, piglets, $66, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.... $40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $39, base; Philadelphia, $41.16, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace..	*$8.75–$9.50
Connellsville, foundry .	9.75–11.50
New River, foundry...	12.50
Wise county, foundry.	11.15
Wise county, furnace..	10.65

* Operators of hand-drawn ovens using trucked coal, $9.35-$10.10.

Foundry Coke

Kearney, N. J., ovens.	$15.35
Chicago, outside del...	15.10
Chicago, del.	16.10
Terre Haute, del.	15.60
Milwaukee, ovens	15.85
New England, del.	17.25
Birmingham, Del.	13.25
Indianapolis, ovens ...	14.50
Cincinnati, del.	15.35
Ironton, O., ovens....	13.35
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens ...	14.50
Portsmouth, O., ovens.	14.00
Fairmont, W. Va., ovens	13.75
Pittsburgh, del.	15.61

Coal Chemicals

Spot, gal, freight allowed east of Omaha. Effective as of Apr. 1, 1947

Pure and 90% benzol.....	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots.....	12.00c
Do., tank cars.....	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	76.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio.....	56.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago.....	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite....	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer.....	$5.95
Old range nonbessemer.....	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.....	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%.....	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50–6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$27–$28

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio .....$27-$27.50	
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio .....$27-$27.50	
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1 .....$39.00	

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.85	3.85	3.85	3.85	3.85	3.85	...	...	...
Cold-Rolled	4.75	4.75	4.75	4.75	...	4.75	...	...	...
Galvanized	5.40	...	...	...	...	.....	...	...	...
Strip, Hot-Rolled	3.85	3.85	3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes.	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. °10G	Gal. °24G	†H-R	†C-R	H-R	C-F	H-R Alloy (∫4140)	Structural Shapes	Carbon ¾"-¾"	Floor ¾" & Thicker
Boston (City)	4.50	5.67[4]	5.22[4]	5.55[4]	6.80[4]	4.65	6.36	4.62	5.22	7.12	4.47	4.70	6.42
††New York (city)	4.42	....	5.27[8]	5.47[5]	....	4.62	....	4.62	5.17	8.42[12]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[8]	5.37[5]	....	4.52	....	4.52	....	....	4.27	....	6.25
Philadelphia (city)	4.34	5.73[9]	5.33[9]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.13	6.87	4.22	4.44	5.93
Philadelphia (country)	4.24	5.63[9]	5.23[9]	5.19[5]	6.44[5]	4.33	5.18	4.38	.	6.60	4.12	4.34	5.83
Baltimore (city)	4.09	6.15[8]	5.65[8]	5.14[5]	6.39[5]	4.40	....	4.45	5.10	.	4.34	4.39	5.90
Baltimore (country)	3.59	6.05[8]	5.55[8]	....	....	....	....	....	....	.	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[5]	6.43[5]	4.65	....	4.70	5.60[11]	.	4.60	4.65	6.60
Norfolk, Va.	4.35							4.75	5.50	.	4.50	4.50	6.25
Buffalo (city)	4.05	....	4.75[6]	5.35[5]	....	4.30	5.25	4.10	4.75	.	4.10	4.65	5.90
Buffalo (country)	3.90	....	4.60[6]	4.95[5]	.	3.90	4.85	3.95	4.60	6.60	3.95	4.20	5.45
Pittsburgh (city)	3.95†	....	4.75[8]†	5.10[5]	6.35[5]	4.05	5.00	4.10	4.75	6.60	4.10	4.25	5.60
Pittsburgh (country)	3.80†	....	4.60[8]†	4.95[5]	6.20[5]	3.90	4.85	3.95	4.60	6.60	3.95	4.10	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	.	4.218	4.488	5.178
Youngstown, O. (country)	.	....	....	4.95	6.20	3.90	....	....	....	.	....	....	....
Detroit	4.05	5.30	4.85‡	5.42	6.67	4.34	5.24	4.20	4.87[12]	7.01	4.42	4.49	5.98
Cleveland (city)	4.15	5.15[8]	4.85[8]	5.238[5]	6.488[5]	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961
Cleveland (country)	4.00	5.00[8]	4.70[8]	....	....	3.90	4.95	3.95	4.60			4.10	....
Cincinnati	4.016	4.816[8]	.	5.166[5]	6.416[5]	4.394	.	4.403	5.053	.	4.444	4.553	5.944
Chicago (city)	4.15	5.15[5]	4.85[8]	5.10[5]	6.35[5]	4.05	5.10	4.10	4.75	6.60[12]	4.10	4.25	5.75
Chicago (country)	4.00	5.00[8]	4.70[8]	4.95[5]	6.20[5]	3.90	4.95	3.95	4.60	6.60[12]	3.95	4.10	5.60
Milwaukee	4.299	5.299[8]	4.999[8]	5.249[5]	6.499[5]	4.199	5.249	4.249	4.899	6.899	4.249	4.399	5.899
St. Paul	4.384[1]	5.534[8]	5.084[8]	5.434[5]	6.684[5]	4.404[12]	.	4.434[12]	5.726[11]	7.084[11]	4.434[12]	4.684[12]	6.084[19]
Indianapolis	4.04	....	4.84[8]	5.29[5]	6.54[5]	4.24	....	4.361‡‡	5.26	.	4.36	4.61	6.01
St. Louis	4.699	....	4.899[9]†	5.424[5]	6.674[5]	4.199	....	4.249	5.074[12]	7.074	4.249	3.999	5.899
Birmingham (city)	3.85[20]	....	....	5.20[5]	....	4.10[20]	....	4.05[20]	5.58	.	4.05	4.30	6.56
Birmingham (country)	3.75[20]	....	....	5.20[5]	....	4.00[20]	....	3.95[20]	.	....	3.95	4.20	....
New Orleans	4.46[20]°°°	....	5.77[8]	....	....	4.83[20]	....	4.78[20]°°°	5.94[11]	.	4.68[20]°°°	5.03[20]	6.94[20]
Houston, Tex.	5.00[1]	....	....	6.00	....	6.00[1]	....	5.35[1]	.	6.35	5.85	5.85	6.40
Omaha, Nebr.	4.868	6.118[8]	.	5.918[5]	7.168[5]	4.862	.	4.918	5.818[11]	.	4.918	5.068	6.568
Los Angeles	5.35	....	7.00[8]	....	7.45[5]	5.65	8.35	5.10	6.90[19]	9.35	5.20	5.10	7.20
San Francisco	4.90§§	....	6.30[5]	....	7.35[5]	5.20[14]	8.35[14]	4.75[14]	°°°	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Tacoma, Wash.	.	....	....	6.30[5]	....	5.30[17]	....	5.00[17]	7.10[19]	8.50[19]	4.95[17]	5.15[17]	7.25[17]
Seattle	5.00[17]	....	....	6.30[5]	....	5.30[17]	....	5.00[17]	7.10[18]	8.50[19]	4.95[17]	5.15[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]—1500 to 39,999; [20]—400 to 3999 pounds.

° Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; °° add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; °°° rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., $44, Pittsburgh, $48. 16% to 19% Mn, Pittsburgh, $47.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie-Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.27; contract, $2.25; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ⅛ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $2.90, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Copper Stabilized at 21.50-Cent Level

All sellers testing new price, ending long period of uncertainty . . . Copper product prices revised

NEW YORK—World copper market was re-established last week on the basis of 21.50c, Connecticut Valley, following several weeks of confusion. When the 4-cent United States copper import tax was suspended in April some trade interests thought the price pace would be set by the 24-cent foreign market, but consumer opposition, both in this country and abroad, to the high foreign quotation resulted in a drop in demand almost to the vanishing point for metal produced outside this country.

The Canadian government has removed all price controls over copper, lead and zinc, but still retains controls over tin. The action gives recognition to the changed status in the world markets of these metals now decontrolled.

New prices to the Canadian consumers are: 21.50c for copper, against 16.62½c, the former ceiling; 14.25c for lead, against 10.62½c; and 11.00c for grade A zinc, against 10.25c.

Great Britain has contracted for about 75 per cent of the Dominion's exportable copper surplus, covering the final six months of 1947. It also is taking about 3500 tons a month of the roughly 12,000 tons monthly output of lead. Canada's home requirements for lead are figured at around 4000 tons monthly, which leaves about 4500 tons monthly available for export to the rest of the world. It is estimated that Great Britain is taking about 4000 tons of zinc each month out of an approximate Canadian production of 12,000 to 14,000 tons monthly. After home consumption has been taken care of, it is figured that the United States is absorbing the bulk of the remainder, although France also is said to be taking fair amounts.

COPPER — Following establishment of the domestic and world markets on the basis of 21.50c for electrolytic, copper and brass product producers revised their quotations to that basis. The market was not uniform, however, since Chase Brass & Copper Co. Inc., announced that its base prices had been advanced ¾-cent a pound and that it had made certain changes in discounts from extras. These changes were made to compensate for additional costs arising from recent wage and salary increases. The prices are predicated on 21.50c a pound for copper, the same basis as other leading sellers.

Anaconda Wire & Cable Co. announced that it had reduced its prices of copper wire products by 1 cent a pound.

Custom smelters reduced their buying price for refined copper-making grades of scrap metal by 1 cent a pound.

Board of governors, Commodity Exchange Inc., will permit resumption of trading in copper futures on the exchange July 15. The market will open with trading in the September, 1947, contract. Trading also will be conducted in contracts calling for delivery in all months up to June, 1948. Trading in copper futures on the exchange was suspended July 22, 1941. The last trading took place in the October delivery at 11.65c a pound on July 18, 1941.

The action to resume trading in copper futures makes the New York mart the "world market." This distinction prior to the war was held by the London Metal Exchange.

LEAD—Consumers' bookings of lead for July delivery represent about 25 per cent of the supplies that will be available during that period. Producers continue to allocate tonnages to consumers since demand exceeds supply.

Allocations of lead by the Office of Metals Reserve from the Reconstruction Finance Corp.'s stockpile are expected to amount to about 7200 tons this month, which will bring the stockpile near the vanishing point since it totaled only about 9000 tons at the beginning of the month.

ZINC—Smelter production in May totaled 73,970 tons compared with 73,891 tons in April. With production continuing close to peak levels, domestic shipments declined about 3000 tons further in May to 58,827 tons. This is the smallest total since last August when domestic consumption took only 43,522 tons and is nearly 20,000 tons below the peak deliveries of 77,904 tons in December, 1946. However, export deliveries increased 1450 tons in May to a total of 11,976 tons. Thus, total deliveries in May amounted to 70,803 tons, or only about 1400 tons less than in April, but they are now more than 20,000 tons below the peak deliveries of 91,429 tons recorded last November. Stocks in the hands of smelters and the Office of Metals Reserve increased 3167 tons to a total of 166,864 tons.

TIN—Senate subcommittee has reported favorably a bill which would extend until June 13, 1949, the authority to continue operating the tin smelter at Texas City, Tex.

Government officials stressed last week in statements before the House Judiciary committee the extreme need for continuing controls on tin and antimony. The subcommittee is considering a bill to continue these controls for one year. Under-Secretary of State Dean Acheson asked for continuation of export priorities assistance for tin products. Tin plate exports, he said, by assisting in the preservation of foodstuffs abroad, in part relieve the United States of the necessity of exporting even larger supplies of food for the needs of countries of the world.

It was brought out at the hearings that domestic tin requirements for the fiscal year 1948 remain at about 90,000 tons on a restricted basis and 121,000 tons if controls are lifted. However, world supply estimates have been revised downward from previous estimates.

PLATINUM—Price of platinum was reduced $2 an ounce last week to the basis of $56 an ounce wholesale and $59 retail. Dealings have been quiet for some time with the jewelry industry generally holding to the sidelines. Iridium also was reduced by $5 an ounce to $80 wholesale and $90 retail.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.50c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 23.50c; No. 1 yellow (No. 405) 15.75c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 13.00c; grade 3 (90-92%) 12.25c; grade 4 (85-90%) 11.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $84-$87 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 70.75c per ounce.

Platinum: $56-$59 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; yellow brass 28.88c; commercial bronze, 95% 32.97c, 90% 32.36c, red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29.28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Wire: Yellow brass 29.17c; commercial bronze, 95% 33.26c, 90% 32.65c; red brass, 85% 31.53c, 80% 30.92c; best quality brass 30.18c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 31.13c, 15,000 lb or more 31.38c, less carlots 31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb. 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb 45.50c; 1000 to 1999, 46.50c; 600 to 9999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices for less than 15,000 lb fob shipping point. Add ½c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.50, No. 2 copper 16.50, light copper 15.50, composition red brass 14.50, auto radiators 11.00, heavy yellow brass 10.00, brass pipe 10.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 17.37½; No. 2 copper, 15.87½, light copper, 14.37½; refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 13.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.00, No. 2 15.00, light copper 14.25; No. 1 composition red brass 12.50, No. 1 composition turnings 11.50, mixed brass turnings 7.50, new brass clippings 12.00, No. 1 brass rod turnings 10.50, light brass 6.50, heavy yellow brass 8.00, new brass rod ends 11.00, auto radiators, unsweated 9.50, cocks and faucets 9.50, brass pipe 9.00.

Lead: Heavy lead 11.50-12.00, battery plates 6.75-7.25, linotype and stereotype 12.75-13.25, electrotype 10.75-12.25, mixed babbitt 13.50-14.00, solder joints 15.50.

Zinc: Old zinc 5.00-5.50, new die cast scrap 4.00-4.50, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 8.50-9.00, old sheets 6.50-7.50, crankcase 6.25-6.75, borings and turnings 2.25-3.50, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 19.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00-10.00, old sheet 11.00-12.00, rods 12.50-13.00, castings 10.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$32.50
No. 2 Heavy Melt. Steel	32.50
No. 1 Busheling	32.50
Nos. 1, 2 & 3 Bundles	32.50
Machine Shop Turnings	26.50-27.00
Mixed Borings, Turnings	26.50-27.00
Short Shovel Turnings	29.50-30.00
Cast Iron Borings	28.00-28.50
Bar Crops and Plate	39.00-40.00
Low Phos. Cast Steel	39.00-40.00
Punchings & Plate Scrap	39.00-40.00
Cut Structurals	39.00-40.00
Elec. Furnace Bundles	39.00-40.00
Heavy Turnings	31.00-31.50
No. 1 Chemical Borings	31.00-32.00

Cast Iron Grades

No. 1 Cupola	40.00-41.00
Charging Box Cast	34.00-35.00
Heavy Breakable Cast	33.00-34.00
Stove Plate	37.50-38.00
Unstripped Motor Blocks	37.50-38.00
Malleable	44.50-45.00
Brake Shoes	35.00-36.00
Clean Auto Cast	40.00-41.00
No. 1 Wheels	42.00-42.50
Burnt Cast	35.00-36.00

Railroad Scrap

No. 1 R. R. Heavy Melt.	36.00-36.50
R.R. Malleable	44.50-45.00
Axles	40.00-41.00
Rails, Rerolling	37.00-37.50
Rails, Random Lengths	35.00-36.00
Rails, 3 ft and under	39.00-39.50
Rails, 18 in. and under	41.00-41.50
Railroad Specialties	42.00-43.00
Uncut Tires	38.00-39.00
Angles, Splice Bars	38.00-38.50

CLEVELAND

No. 1 Heavy Melt. Steel	$31.00-34.00
No. 2 Heavy Melt. Steel	31.00-34.00
No. 1 Busheling	31.00-34.00
Nos. 1 & 2 Bundles	31.00-34.00
Machine Shop Turnings	27.00-27.50
Mixed Borings, Turnings	28.00
Short Shovel Turnings	28.00
Cast Iron Borings	27.00-28.00
Bar Crops and Plate	35.50-37.00
Cast Steel	35.50-37.00
Punchings & Plate Scrap	35.50-37.00
Elec. Furnace Bundles	33.50-35.00
Heavy Turnings	32.00-33.50
Alloy Free Turnings	29.50-30.00
Cut Structurals	37.50-38.00

Cast Iron Grades

No. 1 Cupola	43.00-45.00
Charging Box Cast	38.00
Stove Plate	38.00
Heavy Breakable Cast	38.00
Unstripped Motor Blocks	40.00
Malleable	52.00-55.00
Brake Shoes	42.00
Clean Auto Cast	45.00
No. 1 Wheels	42.00
Burnt Cast	38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	35.00-37.00
R.R. Malleable	52.00-55.00
Rails, Rerolling	40.00-41.00
Rails, Random Lengths	41.00-43.00
Rails, 3 ft and under	44.00
Railroad Specialties	42.00
Uncut Tires	41.00
Angles, Splice Bars	44.00

VALLEY

No. 1 Heavy Melt. Steel	$35.00
No. 2 Heavy Melt. Steel	35.00
No. 1 Bundles	35.00
Machine Shop Turnings	27.00
Short Shovel Turnings	28.00-30.00
Cast Iron Borings	28.50-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	35.00-37.00

MANSFIELD

No. 1 Heavy Melt. Steel	$33.00-34.50
Machine Shop Turnings	27.00
Short Shovel Turnings	29.00

CINCINNATI

No. 1 Heavy Melt. Steel	$29.00
No. 2 Heavy Melt. Steel	28.00
No. 1 Busheling	28.00
No. 1 Bundles	28.00
No. 2 Bundles	28.00
Machine Shop Turnings	27.00
Mixed Borings, Turnings	
Short Shovel Turnings	
Cast Iron Borings	

Cast Iron

No. 1 Cupola Cast	41.00
Charging Box Ca	32.00
Heavy Breakable st.	35.00
Stove Plate	30.00
Unstripped Motor Blocks	33.00
Brake Shoes	29.00
Clean Auto Cast	39.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00
R.R. Malleable	46.00
Rails, Rerolling	36.00
Rails, Random Lengths	36.00
Rails, 18 in. and under	43.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$27.50-28.00
No. 1 Busheling	27.50-28.00
Nos. 1 & 2 Bundles	27.50-28.00
No. 3 Bundles	27.50-28.00
Machine Shop Turnings	22.50-23.00
Mixed Borings, Turnings	22.50-23.00
Short Shovel Turnings	23.50-24.00
Cast Iron Borings	23.50-24.00
Punchings & Plate Scrap	32.00-32.50

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Heavy Breakable Cast	25.00-27.00
Clean Auto Cast	33.00-34.00

BUFFALO

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	31.00-32.00
No. 1 Busheling	31.00-32.00
Nos. 1 & 2 Bundles	31.00-32.00
Machine Shop Turnings	23.50-24.00
Mixed Borings, Turnings	23.50-24.00
Cast Iron Borings	23.50-24.00
Short Shovel Turnings	24.00-25.00
Punchings & Plate Scrap	35.00-36.00
Elec. Furnace Bundles	37.00-38.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-38.00
Heavy Breakable Cast	33.00-34.00
Malleable	38.00-39.00
No. 1 Wheels	35.00-36.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$32.00-32.50
No. 2 Heavy Melt. Steel	31.00-32.00
No. 1 Busheling	31.00-32.00
No. 1 Bundles	32.00-32.50
No. 2 Bundles	31.00-32.00
No. 3 Bundles	29.00-30.00
Machine Shop Turnings	24.00-25.00
Mixed Borings, Turnings	22.00-23.00
Short Shovel Turnings	25.00-25.50
Bar Crops and Plate	35.50-36.50
Punchings & Plate Scrap	35.50-36.50
Cut Structurals	34.50-35.50
Elec. Furnace Bundles	33.50-34.50
Heavy Turnings	33.00-33.50
No. 1 Chemical Borings	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	43.00-44.00
Charging Box Cast	41.00-42.00
Heavy Breakable Cast	41.00-42.00
Unstripped Motor Blocks	39.00-40.00
Malleable	50.00-52.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	43.00-44.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$27.00-27.50
No. 2 Heavy Melt. Steel	27.00-27.50
No. 1 Busheling	27.00-27.50
Nos. 1 & 2 Bundles	27.00-27.50
No. 3 Bundles	25.00-25.50
Machine Shop Turnings	20.50-21.00
Mixed Borings, Turnings	20.50-21.00
Short Shovel Turnings	22.00-22.50
Punchings & Plate Scrap	30.00
Cut Structurals	30.00
Elec. Furnace Bundles	28.50-29.00
No. 1 Chemical Borings	23.00-24.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-38.00
Charging Box Cast	36.00-37.00
Heavy Breakable	36.00-37.00
Unstripped Motor Blocks	33.00-34.00
Malleable	46.00-48.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$26.00-27.00
No. 2 Heavy Melt. Steel	26.00-27.00
Nos. 1 & 2 Bundles	24.25
No. 1 Busheling	22.25-24.25
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	18.00-19.00
Short Shovel Turnings	21.00-22.00
Bar Crops and Plate	27.00
Punchings & Plate Scrap	27.00
Chemical Borings	21.00-22.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	38.00
Heavy Breakable Cast	33.00
Stove Plate	37.00
Unstripped Motor Blocks	30.00
Clean Auto Cast	40.00

CHICAGO

No. 1 Heavy Melt. Steel	$29.00
No. 2 Heavy Melt. Steel	29.00
Nos. 1 & 2 Bundles	29.00
No. 3 Bundles	26.50-27.00
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	23.00-24.00
Short Shovel Turnings	25.00-26.00
Cast Iron Borings	24.00-25.00
Bar Crops and Plate	31.00-31.50
Cast Steel	31.00-31.50
Punchings	31.00-31.50
Elec. Furnace Bundles	29.50-30.00
Heavy Turnings	28.00-28.50
Cut Structurals	30.50-31.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-43.00
Malleable	40.00-45.00
Clean Auto Cast	40.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.50-30.00
Rails, Rerolling	33.50-34.50
Rails, Random Lengths	32.50-33.50
Rails, 3 ft. and under	36.50-37.50
Rails, 18 in. and under	37.50-38.50
Railroad Specialties	34.50-35.50
Angles, Splice Bars	34.50-35.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	26.50-27.50
Machine Shop Turnings	21.00-22.00
Short Shovel Turnings	22.00-23.00

Cast Iron Grades (Fob shipping ponit)

No. 1 Cupola Cast	37.50-38.50
Charging Box Cast	30.00-31.00
Heavy Breakable Cast	29.00-30.00
Stove Plate	29.00-32.00
Brake Shoes	32.00-35.00
Clean Auto Cast	37.50-38.50
No. 1 Wheels	38.00-40.00
Burnt Cast	29.00-32.00

Railroad Scrap

R.R. Malleable	45.00-47.00
Rails, Rerolling	30.00-33.00
Rails, Random Lengths	30.00-33.00
Rails, 3 ft and under	37.00-39.00
Uncut Tires	32.00-34.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	27.00
Nos. 1 & 2 Bundles	27.00
No. 3 Bundles	25.00
Long Turnings	22.00
Short Shovel Turnings	24.00
Cast Iron Borings	23.00
Bar Crops and Plate	32.00-33.00
Punchings & Plate Scrap	36.00-37.00
Cut Structurals	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Stove Plate	34.00-35.00
No. 1 Wheels	32.00-32.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R.R. Malleable	37.50-38.00
Axles, Steel	33.00
Rails, Rerolling	36.00-37.00
Rails, Random Length	30.00-31.00
Rails, 3 ft and under	32.00-33.00
Angles and Splice Bars	32.00-33.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles	27.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

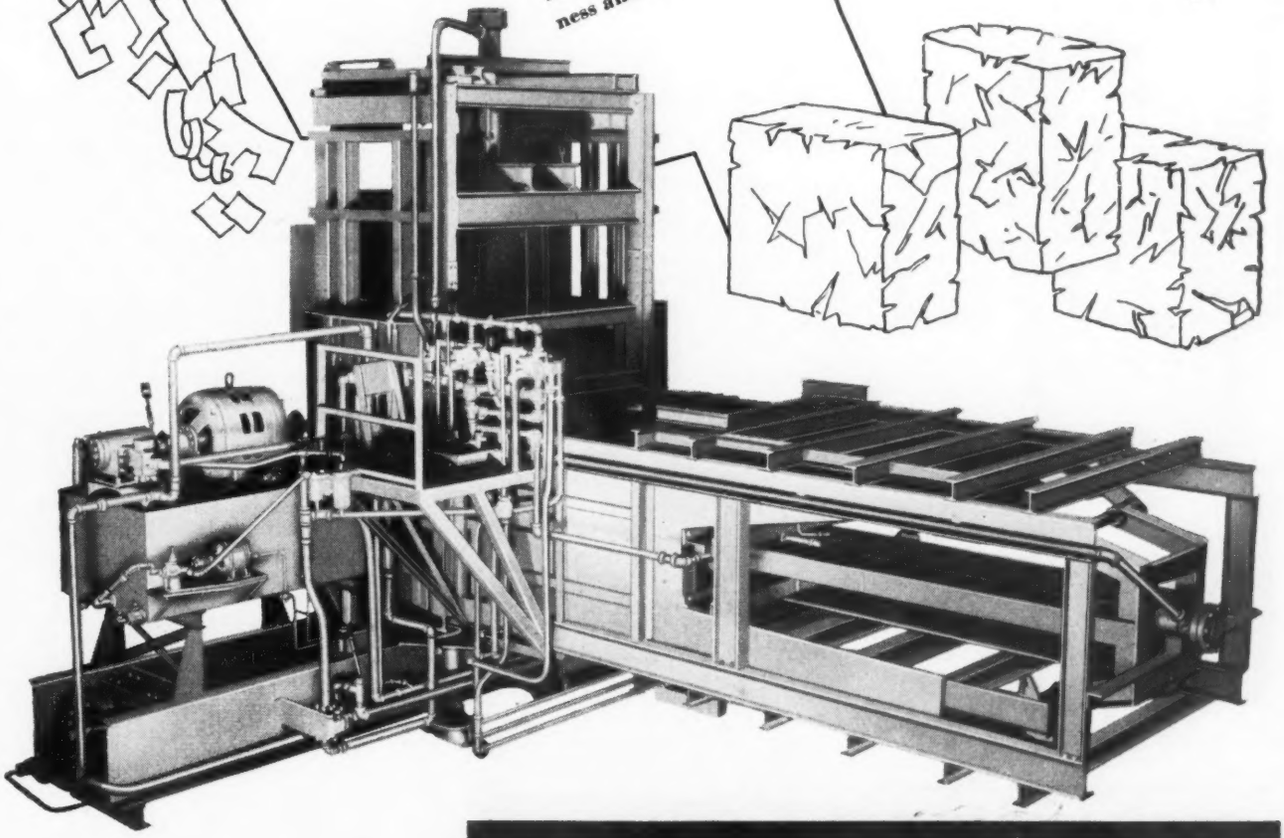
BALE SHEET METAL SCRAP

Increase Profits through Greater Efficiency

Reduce Accidents to a Minimum

The Harris 4 A Baler is not comparable to any other press due to its revolutionary design. This incorporates 1—The vertically operating tramper door which means continuous operation in that a charge can be loaded while a bundle is being compressed. 2—The Harris 4 A Baler is equipped throughout with micromatic honed cylinders which means perfect concentricity and extremely close tolerances. This greatly increases the life of all packings as well as the life of the machine itself and gives a smooth operation. 3—The Harris 4 A Baler is equipped with Vickers vane-type rotary pumps and ultra modern valve equipment.

The Harris 4 A Baler located adjacent to your railroad siding is easily adaptable to conveyor equipment for delivering scrap to the press and the finished bundles to the car with an absolute minimum of labor. This reduces the production cost of bundles amazingly, and means: 1—Reduction in labor cost; 2—Increased profits; 3—Safety; 4—Cleanliness and orderliness in your plant.

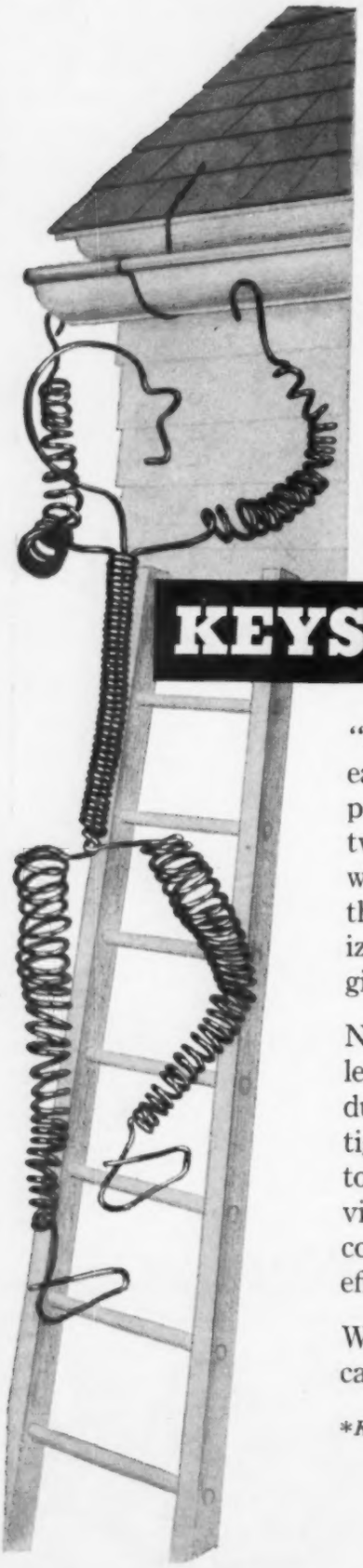


Harris Scrap Metal Baling Press Model 4 A

HARRIS FOUNDRY & MACHINE CO.

Reclamation Engineers Since 1889

CORDELE, GEORGIA



"FAULTLESS"*

eave trough hangers made of

KEYSTONE WIRE

"Faultless" eave trough hangers are easy to install, and are built to stay put. The double-twist stem and triple-twist backbone hold the eave trough where it belongs . . . and keep it there. A heavy silver-bright galvanized coating resists the elements, giving years of rust protection.

Naturally the wire used in "Faultless" wire hangers must be extremely ductile and uniform to withstand tight twisting, yet sufficiently stiff to hold its shape. Keystone wire provides these qualities — qualities that count so much toward manufacturing efficiency.

Whatever the wire need, Keystone can normally supply it.

*Klauer Manufacturing Company, Dubuque, Iowa

KEYSTONE MUSIC SPRING WIRE

SPECIAL ANALYSIS WIRE for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

Sheets, Strip. . .

Supply fails to meet heavy demand despite sustained record production

Sheet Prices, Page 146

Philadelphia—Sheets and strip are being turned out at possibly the highest rate ever recorded, but supply is still falling short of requirements in most instances. Possibility of a coal strike next month is causing concern, with some consumers pressing for shipments. On the other hand, some consumers who are planning to close down their plants soon for a week or two for vacations are making no provision for shipments during the period of suspension. Furthermore, in some consuming lines, although in few major consuming lines, inventories are getting in balance.

Boston—There is some evidence that inventories are being built up on some flat-rolled products and buying pressure is slackening. Demand for sheets and strip is heavy, but in narrow cold-rolled strip cancellations and deferments trickle in mild volume. Shortages in flat-rolled have had an indirect effect for some time on buying of other steel products and inventories are gradually working toward better balance. More consumer goods pipe lines are filling at retail levels and mild easing in new orders and pressure for light rolled steel is developing. This has been delayed in coming to the surface in some instances due to the need of replenishing inventories. One case in point is the shoe industry. Production is off, but buying of shank steel and tack plate is now in excess of consumption and for the first time in many months users are adding to inventory. Production of narrow cold-rolled strip continues hampered by unbalance in hot-rolled strip and prices still show a range, depending on the basing point and extra applications. In the immediate future, more frequent changes in buying and demand trends, depending on individual circumstances, are looked for with top management scrutinizing more closely the dollar and physical inventories.

New York — While there is a strong undertone to sheet demand, especially for hot, cold, and galvanized sheets and enameling stock, the market for light flat-rolled products is relatively quiet on the surface as compared with several weeks ago. This is ascribed in part to seasonal influences and also to the fact that allotments for the third quarter have been generally settled upon. Stainless demand is still lagging, in both sheets and strip, and also for that matter in bars and wire, and electrical sheet supply is beginning to catch up with requirements, especially for small motors and fluorescent ballast. As a matter of fact, there is some easing in demand for galvanized for window frames, furnace casings, and so forth, but this latter is all so overshadowed by demands in other directions that this development is not too important.

Pittsburgh — Sheet and strip rolling schedules are expected to register any significant revision for third quarter. Hold-up of shipments or cancellation of orders, due to unbalanced customers' inventories in relation to projected production schedules has been practically non-existent. Many metalworking companies have for months been tooled-up for rec-

ord output of civilian goods, but limited sheet and strip tonnage available has restricted production schedules, which in turn has resulted in an unbalanced inventory position of other steel items. Uninterrupted production through third quarter would relieve the delivery pressure somewhat for most sheet and strip items. Expansion in rolling mill facilities, scheduled to be brought into service through remainder of this year, will be an important contributing factor in helping meet huge pent-up demand. Stainless and alloy items appear to be the only exception to current active demand for sheets and strip.

Cleveland — All grades of sheet and strip, except alloy and stainless, remain in tight supply and likely will remain so throughout 1947. Bookings are still on a quota basis and have been reduced for the third quarter in an effort to reduce the heavy order backlog. The housing program is taking a large tonnage each period, reducing the amount that otherwise would be available to the automotive, household appliance and other larger users. Alloy and stainless flat rolled products are not on a quota basis and most grades are available for delivery within four weeks. Delivery is on a "negotiated" basis.

Chicago—Sheet and strip makers are unable to make headway in reducing heavy backlogs. Consumers specify virtually 100 per cent against assigned quotas and seek increased quantities which producers are unable to accommodate. Cancellations or shipment holdbacks are almost nonexistent, although there are instances in which there is doubt as to whether the material is being consumed as rapidly as received. Lack of other materials and components is known to be retarding schedules of many sheet and strip users, however, all seem disposed to accept tonnage earmarked for them.

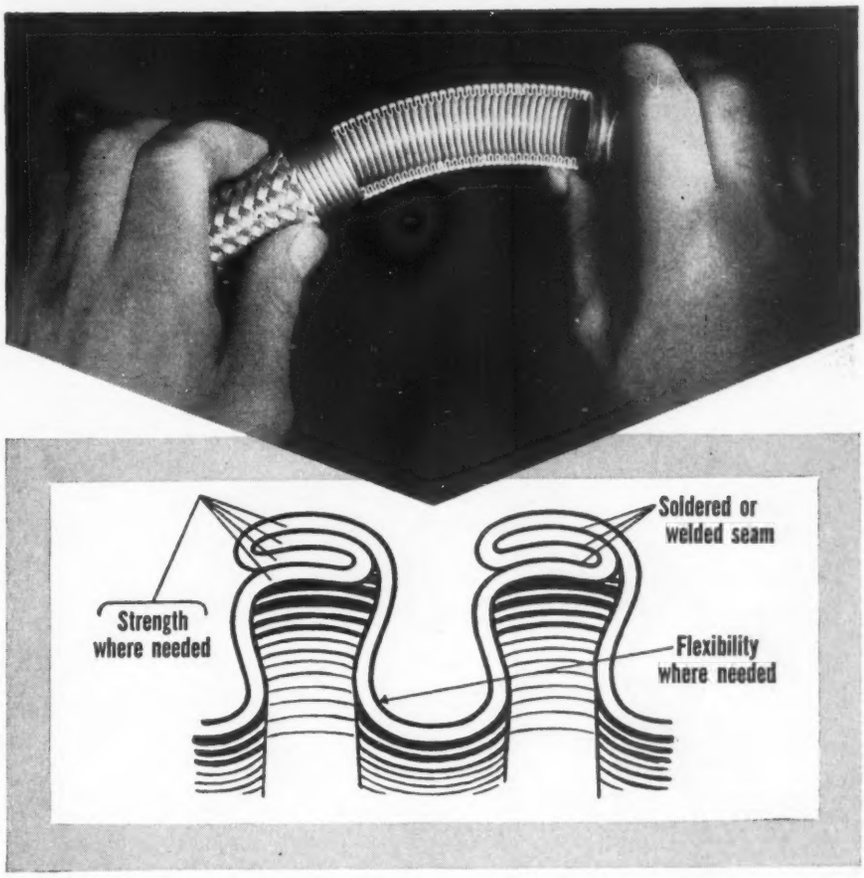
Cincinnati — Demand of sheet users for tonnage from district mills gives no indication that balance in production and requirements is near. Mill interests are under constant pressure for more liberal tonnages; needs of automotive and household equipment manufacturers in particular cannot be satiated. Cutbacks and cancellations appear infrequently, and for minor volume.

Birmingham—No evidence of relaxation is seen in the district's sheet situation. Sheet users continue their efforts to obtain greater tonnage to supply actual current needs. Specifications continue to be received at a rate somewhat in excess of shipments, although bookings generally are not being made farther ahead than five months in most instances.

St. Louis — Projected opening of Granite City Steel Co.'s books on hot-rolled sheets for the remainder of the third quarter has been postponed pending a survey of orders to see how rolling schedules stand. Indications are that few, if any, gaps will be found. Production continues to edge upward from the 40 per cent of capacity of the last few weeks as members of the striking machinists union desert and return to work as CIO Steelworkers members. Capacity operations are expected by the end of June. Finishing capacity currently is out of balance with open-hearth capacity. By October, however, a new cold mill is due for completion, after which the company expects to be abreast with present orders within two or three months.

When the going is ROUGH

Titeflex stands up



The drawing above illustrates exactly why Titeflex all-metal flexible tubing stands up under the most rugged conditions.

Note that there are *four* thicknesses of metal at the top of each convolution—right where the greatest wear is encountered.

Note that flexibility is achieved by wall construction without deforming or stretching the metal. There are no packed, sliding joints to wear out or decompose.

Note that the metal strips are soldered tightly together to prevent leakage of both gases and liquids.

Note that Titeflex tubing is *all metal*—it is unaffected by gas, oil or liquids . . . and withstands high temperatures. Yet it is fully flexible and holds up under excessive vibrations.

Your are invited to make full use of the Titeflex research laboratories and engineering service in solving your tubing problems. Write today for full information. Catalog on request.

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Exclusive Manufacturers of Titeflex high quality products for more than 30 years

Sales Offices { CHICAGO CLEVELAND DETROIT PHILADELPHIA LOS ANGELES BOSTON SAN FRANCISCO TORONTO

Steel Bars. . .

Bar Prices, Page 146

New York — Although demand for hot-rolled carbon bars in general is still in excess of supply, consumer pressure in this district is unquestionably easier than it was a few weeks ago. As a matter of fact, in some instances, except where the very small sizes are involved, consumers are now getting sufficient tonnage to meet their current requirements. Evidences of easing pressure are noted in several ways, notwithstanding substantial demand. Matter of suspensions is now coming up for vacation periods, beginning late this month and, with few exceptions, consumers indicate they want shipments held up during the time their plants are shut down. Then again there are instances where the mills have fallen short on promised shipments without creating any particular comment from the consumers. Cases of failure to complete shipments without complaint on the part of consignees would have been rare several weeks ago. New inquiry is not quite as brisk.

Cold finished carbon bar demand continues off, although much depends upon the size. In general, sellers can book orders on all but the very small sizes within three to four months. On certain of the small specifications, small flats in particular, deliveries are far extended. In fact, one midwestern mill is booked solidly until next April on small flats.

Situation in both hot and cold-finished alloy bars remains easy. Four and five weeks seem to be the general rule on hot-rolled and four to seven weeks on cold-finished alloys.

Boston — Although easing in more sizes and grades notably cold-finished, there are tight spots in bars where improvement is still some distance away. Flats, half rounds and special shapes in commercial and high-carbon grades are in this category, both hot and cold-drawn. Only those with smaller, or wire sizes, and ground stock are allocated for the third quarter by most cold-drawers as supply and demand are in approximate balance. Some improvement in available tonnage on hot-rolled may result through heavier offerings by mills experiencing a balance or excess in cold-finished. Several of the latter have been curtailing hot-rolled tonnage in favor of cold. Scattered individual consumers are better balanced on hot-rolled carbon and are easing pressure for shipments here. Some forge shops are seeking orders, having built up banks of forged parts in excess of current and nearby prospective assembly schedules. Bessemer hot-rolled bars are especially tight while on the other end of the delivery range alloys are easy.

Philadelphia—While there is some easing in hot-rolled carbon bar demand, most producers are well booked up for the third quarter, except in some of the larger sizes. Some producers are fairly well caught up in back commitments, except in the smaller sizes of flats and rounds. However, there is still considerable demand and one large producer, who aims to maintain a backlog of about four months, will set up quotas shortly for October delivery. Cold drawers can still book tonnage in a range of sizes for third quarter shipment and in most instances are willing to accept business for shipment as late in the year as consumers are willing to specify, and even beyond in some instances. Demand for alloy bars remains easy, with deliveries freely available within four to six weeks on the hot alloy and within five to seven weeks on the cold alloy.

Cleveland — Many of the small bar and very large bar mills, the latter producing up to around 11½-inch sizes, are sold out for the balance of this year. In the intermediate sizes, deliveries are available for fourth quarter. Demand for alloy bars has improved recently and supplies are not as free as they were earlier in the year.

Birmingham—Activity in reinforcing bars is not particularly marked in this district, a fact attributable largely to high and uncertain building costs which has led to postponement of quite a few projects and actual abandonment of a few.

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Roller Bearings
AMERICAN RADIAL ROLLER BEARINGS are engineered to exacting standards that result in better performance and minimum maintenance.
Furnished in 5 styles, 6 S.A.E. series and 35 sizes. Special designs also available. Write.
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Pacific Coast Office:
1718 S. Flower St., Los Angeles, Calif.

Steel Plate. . .

Plate Prices, Page 147

Boston—Plate fabricating shops are generally more conservative in buying, placing orders only as far ahead as necessary to insure them steel they need. In this connection, most fabricators have substantial order backlogs, but new volume is slackening. There are signs of a turn toward a buyers' market for some fabricated plate work. More plate users insist on buying what they want, rather than what they can get. Demand for light welding quality plates for small tanks is unabated and somewhat contrary to the trend as shortage in these

sizes and widths continues. On the other hand, recent deliveries of heavier plates to weldment shops has been best in months. Part of this represents accrued delinquent tonnage and for the moment some weldment shops have plenty of plates. Largest fabricator in this district is operating on a 24-hour, five-day week schedule. Mills are making slight inroads on backlogs, primarily due to limited acceptance of new orders and reductions in allocations. The latter is expected to be reflected more clearly by late July. Fabricators with the largest order backlogs are usually more watchful of inventory. Another factor which may favorably affect the overall plate situation is the freight car building program. Mills supplying the bulk of the tonnage for this program are current and are delivering plates to car shops in excess of current assembly schedules. If this continues and deferments develop, flow of tonnage to miscellaneous users might temporarily benefit.

Pittsburgh—Little headway has been made against mills' order backlogs, particularly in light gage items, despite relatively heavy plate production to date this year. Expanding railroad requirements, miscellaneous tank needs and demand for large diameter pipe indicate a very active demand for plates through remainder of this year. Fabricating shops note a steady volume of new inquiries, but much of this work will not be completed until late this year due to inability to make much headway against present order backlogs.

Philadelphia—Plates continue in strong demand, although inquiry does not appear to be quite as pressing as a few weeks ago, due possibly in part to seasonal influences. At the same time, bolstering pressure is the threat of a coal strike next month, with some fabricators urging mills to supply them with tonnage against third quarter quotas. However, producers generally are behind on their current commitments and are able to do little in this respect. At least two district mills will be down for a week around the July 4 holiday for vacations, with one closing down its open hearth as well as finishing department for the entire period. Where vacations are not fully covered in this period, schedules will be staggered.

The Coatesville, Pa., producer is closing down its 120-inch mill for a week for repairs, beginning June 23. Employees generally in this department will apply the week to their vacations. Where longer time is required for vacations, schedules will be staggered, as probably will be done in other departments. The Harrisburg, Pa., producer, effective this week, will close down its 126-inch mill for two weeks for repairs and the installation of new equipment.

Birmingham — No easing in demand for plates is evident in the southeast. Unofficial but reliable information from mill sources is that demand and requirements will continue ahead of production, at least for another six months; probably into the first quarter of next year. Freight car production at Bessemer continues to take a large tonnage of plates and plans recently were announced to materially step up output at the Bessemer plant.

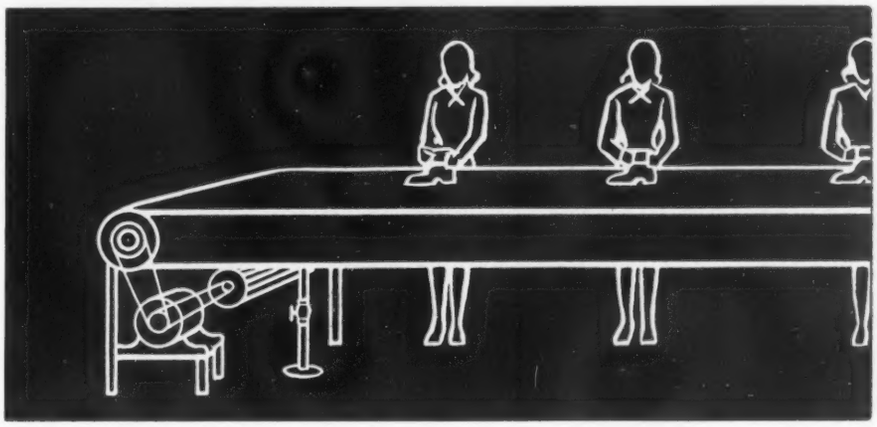
Seattle — Plates continue in good demand but supplies are inadequate to enable many firms to bid on sizable jobs. Plant operations are on a steady basis due to placement of numerous small contracts.

Wire . . .

Wire Prices, Page 147

Boston—Some effect on the rod supply to nonintegrated mills may emanate from the acquisition of one of the largest producers in the Worcester district. Johnson Steel & Wire Co. will be operated as a subsidiary of Pittsburgh Steel Co. and will benefit in rod tonnage. A substantial part of semifinished processed by the Johnson mill has come from eastern Pennsylvania. Annual capacity of the Worcester producer is about 25,000 tons, chiefly high carbon. To what extent more eastern Pennsylvania rod tonnage will be available to other mills is uncertain, but there is a market for all in sight, temporarily at least. Demand for wire has slackened mildly and more products are included. Heading wire requirements continue at a high level with screw producers buying a higher than normal ratio of drawn wire compared with rods which are not available for drawing to size. Bulk is basic, but volume of resulphurized material is substantial. Galvanized wire is short with numerous users. Prospects for more overall wire tonnage in the third quarter is dim, due to approaching losses in production by vacation closings. Supply of nails continues limited.

Chicago—Demand for baling wire and bale ties, medium and small nails, woven



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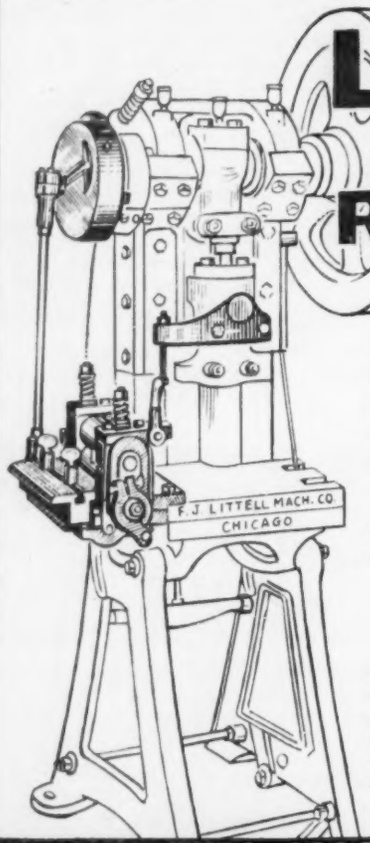

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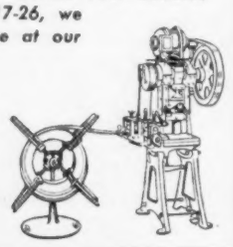

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wire fencing and other merchant wire items continues so strong that wire manufacturers are unable to satisfy jobbers and distributors. Requirements for tacks has dropped off somewhat, reflecting the reduced operations of furniture makers, due to price resistance. All manufacturers wire holds in strong demand. A few cancellations are noted in electrical grades of wire, a result of overordering by distributors, but the volume so far is insufficient to result in easing of mill schedules.

Birmingham—Wire products continue in short supply with little prospect for supply to approximate demand, at least in the third quarter. A large proportion of the district's wire output annually goes into farm use, a demand that is already well and under and will remain steady throughout the summer months.

Tubular Goods...

Tubular Goods Prices, Page 147

Boston — Inability of larger consumers of steel pipe, especially utilities, to get direct mill shipments throws an abnormal burden on distributors. Allocations generally up to or somewhat in excess of prewar levels are not sufficient to meet this additional demand and most distributors are asking for increased quotas. A large part of this volume is not "distributor" business, normally coming direct to the mills. With the opening of books for next year not expected for some time, utility tonnage likely will be covered and to a greater extent than was the case this year. There is no easing in lap or butt weld steel pipe and the product is one of the tightest in the steel industry. In the construction field, the high ratio of engineering work going ahead in the oil refining, chemical and power industries is of a type requiring more pipe per unit. Demand for gas gathering and distribution lines is heavy. Some distributors are hedging on full allotments because of delays in acquiring equipment for machining. Some bicycle tubing deliveries are being extended. Pipe fabricators are consistently pressing for tonnages in the plumbing and heating fields. Distributors have boilers, radiators and accessories with some liquidation on these but are short of steel pipe and fittings.

Cleveland—Tubular goods supply situation varies widely among the various products. While demand for standard and line pipe continues pressing, a buyers' market has developed in mechanical tubing with large tonnages available for prompt delivery. Electric weld mills are booked months ahead, at least one through 1950. One mill has been turning out 20-inch pipe exclusively since February. Jobbers still have no inventory and their quotas from some mills have been cut 10 per cent for July and will probably be cut a like amount for August, following a cut of 15 per cent for June. This action was taken in an effort to bring shipments up to a current basis. New business is coming in slower at the distributor level but this will not be felt at the mills for many months ahead.

St. Louis — Pressure for pipe, especially small sizes, continues to increase. Producers here have had pipemakng capacity at 95 to 100 per cent in recent weeks but can make no inroads on demand. GI housing and residential repairs are the principal source of demand,

commercial and apartment construction work having fallen off notably under price resistance. Pipe tonnage produced is considerably more than the 1939-41 average. Lately mills have been under unusual pressure from farm interests to supply pipe for rural pumps. Badly needed pumps, they say, are stacking up in warehouses for lack of connections. Local steel warehouses report virtually no pipe of any size on hand, even though mills have been attempting to ship warehouses their prewar quotas and maintain a measure of the normal consignment system. Government appeals to mills for diversion of some housing pipe tonnge to other shortage districts are numerous but usually cannot be met. Most old customers still are on mill quotas and little tonnage is available for shipment out of the district.

Seattle—Several sizable cast iron pipe jobs are up for figures this month, including one for the city of Tacoma, Wash., requiring 1300 tons of 4 to 12-inch cast iron pipe; 500 tons of assorted sizes, Bellingham, Wash.; 100 tons of 4 and 6-inch, Helena, Mont. and unstated tonnage of 16-inch for University of Washington, Seattle. Agencies report no improvement in the supply situation, mill deliveries running from 18 to 24 months.

Structural Shapes. . .

Structural Shape Prices, Page 147

Philadelphia—Demand for structurals remains spotty. During the period May 30 to June 5, the government approved 75 projects in this district, valued at $1,127,925, and rejected 21 projects, valued at $286,625, a trend that has been pronounced for some time and has included some fairly sizable jobs. However, builders have been moving slowly because of uncertainty with respect to labor costs and materials, with a result that there have been few new structural inquiries and few awards. At the same time, this situation has relieved pressure somewhat on the shape mills. At least the mills have been able to reduce their backlogs, with operations meanwhile going as fully as the raw steel supply will permit. One large producer, principally by virtue of having blanked out a couple of months in the current quarter, should be fairly well caught up on arrearages by July 1. Most fabricators still have several months' work on hand, and in certain instances this has been largely due to a special drive for business recently.

Boston—In view of high construction costs, a surprisingly large volume of private structural tonnage is being estimated, but how much will go ahead immediately is conjectural. Some projects apparently are being brought out for estimates only and there is reluctance on the part of some shops to figure in view of existing heavy order backlogs. One district shop has a one-year backlog and others are sold to extent of prospective allocations for plain material. No easing in structurals is appearing and the shortage of angles, channels and small sizes remains acute, notably with miscellaneous industrial users. Demand for structural steel from Canada also is heavy, although price differentials are not favorable on plain material as is the case for other exports.

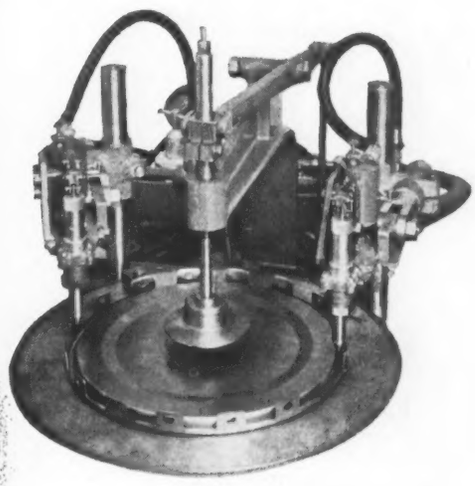
Bridge projects pending in New England account for around 2000 tons, chiefly for small spans requiring little shop work. An exception and the largest is a 1600-ton state bridge at Greenfield, Mass.

New York — Structural activity is improving somewhat both from the standpoint of inquiry and awards. Several projects ranging from 250 to 1100 tons have recently been reported, and several inquiries involving up to 500 tons. In addition, some sizable public work is likely to become active within the next two to four months.

Pittsburgh—An increasing number of instances are noted wherein bids exceed money appropriated for expansion programs. Steadily rising construction costs have resulted in the indefinite shelving of many building programs, particularly municipal work. Structural fabricators continue to report extremely heavy order backlogs, although more active bidding is noted on pending work. Volume of construction projects reviewed by local office of Housing Expediter has tended downward in recent weeks, and this trend is expected to continue. However, substantial tonnage of structurals is involved in the $2 million expansion program of Allis-Chalmers Mfg. Co.'s transformer plant here, which will increase output 50 per cent; and a $1 million warehouse for Jones & Laughlin Steel Corp.

Birmingham — Shapes are moderately active and production holds at a steady pace, although lacking the intensive demand of immediate postwar days. Alabama Power Co. has booked 2500 tons with Ingalls Iron Works Co. for its new steam plant at Gadsden.

They Can't Fall Out!



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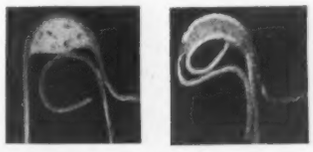

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DAREX "FLOWED-IN" COMPOUNDS MEAN BETTER STEEL PRODUCTS OF ALL KINDS

Reinforcing Bars. . .

Reinforcing Bar Prices, Page 146

Seattle—Local mills are rolling larger tonnages of reinforcing than those of merchant bars and other items. Bookings of small lots, 30 to 50 tons, continue steady and the aggregate represents a large volume. Many major jobs calling for reinforcing bars are either pending or have been delayed for revision of plans. In some instances projects have been postponed indefinitely because of high costs.

Warehouse. . .

Warehouse Prices, Page 149

Pittsburgh — Tie-up of truck shipments continued to severely disrupt steel deliveries from distributors' stocks last week. However, shipments for most essential maintenance and repair accounts have been met, although some warehouse customers report curtailment in operations soon will be necessary should the truckers' strike continue much longer. New extras for hacksawing hot and cold-rolled carbon and alloy bars, also shearing of carbon bars and shapes, were put into effect by distributors last week. New extras for hacksawing are as follows: First cut any length, less 1.05 pounds per foot, 35 cents per 100 pounds; additional cuts over 8 feet long, 6 cents; 8 feet or under, 4 cents. Revisions in these extras are not held to be too significant for most customers order to stock length.

Boston — There are indications that inventories of the more critical carbon products, including flat rolled, structurals, plates, wire products and certain small bars, will move toward better balance through lower demands before mill deliveries bring about that position. New inquiry has declined but less for the products mentioned than for those in better supply, including alloys, tool steel and stainless. Distributors who expected to be able to place heavier orders for the third quarter on the more active short products are meeting with disappointment in most instances. Opinion is more general, however, that more steel will be available ahead of earlier estimates, although some believed this was likely for the third quarter. Plate and structural receipts are slightly heavier, but inventory generally is insufficient to fully meet demand.

Philadelphia — Jobbers report good business, but not up to the May rate which, in turn, was off slightly from the April peak. Current decline is ascribed principally to seasonal influences. Unless there is a coal strike, seasonal influences will likely result in a further drop in July.

Chicago — Warehouse business holds steady and, although receipts of steel from mills are moving in good volume, they are not adequate to permit building up of inventories. Except for certain products, such as alloys, large sizes of bars and cold-drawn bars, material is moved out almost as rapidly as it comes from mills. Receipts of all flat rolled products are far short of customer requirements.

Cincinnati — Warehouse business continues active, the only indication of a decline in demand being the recent attitude of customers who now are willing to wait for specified steel and who decline to accept, as heretofore, anything usable. The overall tonnages from mills are better, although a severe scarcity remains in sheets, plates, small bars and shapes.

St. Louis — Warehouse steel inventories continue to shrink, with mill suppliers predicting still smaller deliveries at least to the end of the year. Hot and cold-rolled sheets are critically short, with plates and structural shapes only slightly less so. On the other hand, hot-rolled carbon bars in the larger diameters and cold finished bars 2 inches and over are in substantially better supply. Demand for carbon bars has shifted to softer steel for peacetime production. Alloy steel is in good supply and sizes are complete.

Seattle—Jobbing houses report steady turnover, all items being in good demand. Inventories continue at a low level as conditions will not permit heavy stocking. Stocks are badly broken. While nails are slightly easier, the supply is still inadequate. No improvement in sheets is reported and this item continues as critical as ever. Reinforcing bar supply is also acutely short, mills' schedules calling principally for rolling other items.

Tin Plate. . .

Tin Plate Prices, Page 147

Chicago—Tin plate production is proceeding at full tilt, yet shipments fall short of consumer requirements. There is considerable pressure for increased allocations, concerning which producers are helpless. The continuing tight situation exists in spite of the fact that vegetable packs this summer and fall seem certain to fall far below original expectations because of poor growing weather, floods and frost damage.

Pig Iron. . .

Pig Iron Prices, Page 148

Pittsburgh—Output of gray iron and steel castings continues to be hard hit by the shortage of pig iron and no relief is indicated through remainder of this year. Scarcity of good quality coke and cast scrap items is additional factor retarding production. Most foundries, with exception of steel, have been unable to make much headway against order backlogs due to restricted operating schedules. Both jobbing foundries and large production shops report no let-up in demand for gray iron and malleable castings; there are no signs of a temporary recession freely predicted for many industrial lines later this year.

Bids will be accepted up to June 27 on a government built blast furnace at Monessen, Pa. The entire facilities are valued at $7 million, and are integrally tied-in with Pittsburgh Steel Co.'s operations at Monessen. Construction of the blast furnace, rated at 432,000 tons annual capacity, was about 95 per cent completed before being suspended at termination of the war.

To conserve coke in anticipation of coal miners' vacation period starting toward close of this month, Carnegie-Illinois Steel Corp. early last week curtailed pig iron output the equivalent of 1½ blast furnaces; later in the week 2 more furnaces were banked due to wildcat strikes at company's coal mines.

New York—While pig iron producers

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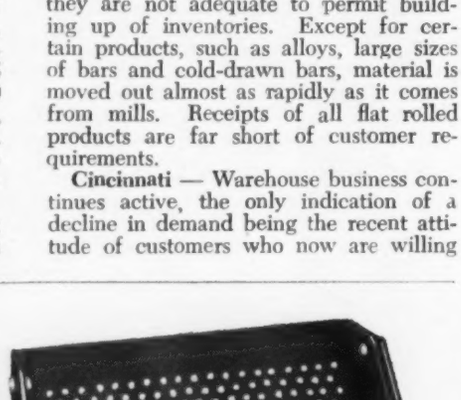

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expect some form of housing allocation to continue after this month, it is possible that it will be on a voluntary basis. In this case, producers would co-operate in much the same manner that finished steel producers have been doing for the past several months. Under the present arrangement, government priorities are due to expire June 30. There is a question, too, as to what may be done with respect to government subsidies on the production of foundry iron, which also are due to expire June 30. It is doubtful that these can be extended under any possible change in the Housing Act, and most producers believe that this month will see the end of subsidies. Accordingly, they are stressing production of the foundry grades over these final weeks. Still another question relates to labor negotiations in the soft coal field and the prospect of a strike. Apparently, however, various pig iron consumers are not too concerned over prospects of a coal strike for in their plans for vacation suspension they are not contemplating taking in shipments of pig iron during these periods.

Boston—Consumers of foundry pig iron in New England are confronted with sharp advances in iron costs from the lowest priced area to the higest, starting July 1. In the second half, pressure for foundry iron has eased slightly, due primarily to the limited amount available. Although some foundries are taking cutbacks in orders, malleable shops with heavy order backlogs and gray iron foundries using that grade are generally better supplied for nearby requirements, although few are building inventories. Cutbacks are not affecting melt and this trend will have to go further before it does in view of the fact that most melters seek to increase the ratio of iron in mixtures. Some basic iron is arriving in the Providence, R. I., district via canal barge. One lot of Netherlands iron, 400 tons, has been sold in this district.

Philadelphia — With general government subsidies, established some months ago to stimulate foundry iron production for the housing program, due to expire June 30, pig iron sellers are endeavoring to turn out as much as they can this month, with a result that basic iron shipments may suffer. The probable termination of these subsidies raises the question as to the effect on the future price trend. While no early increases are reported contemplated, they may come along a little later in the year, especially in view of the likelihood of continued tight supply of iron for some time. While there is an emphasis on foundry iron production this month, some foundries are going to take less because of vacation suspensions.

Chicago—Another week having passed without progress in a contract agreement between miners and coal mine operators has given foundries more worry over pig iron prospects in the next few months. Should the mines close down after June 30, it is known that blast furnaces would bank or blow out speedily because coal reserves are dangerously low. Coke supply has been short since the last mine strike and it would take a long time to recover from another. Foundries have been operating on a hand-to-mouth basis both as to pig iron and coke, thus rapid shutdowns would be forced by a strike.

Buffalo—Pressure for pig iron deliveries has eased slightly as foundries have begun vacation shutdown periods. Despite this easement, merchant iron sellers

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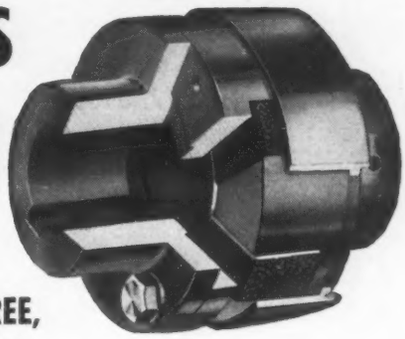

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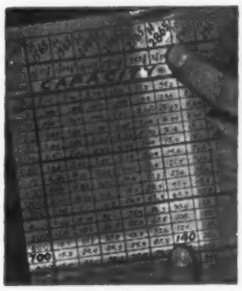

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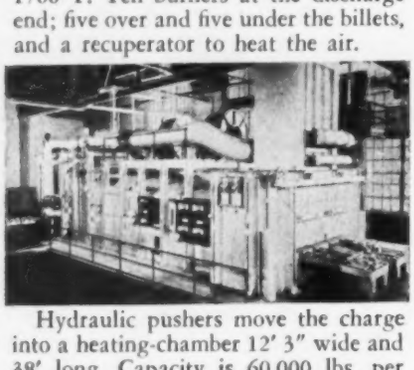
Pic shows an R-S Continuous Wire Bar Heating Furnace at the Hawthorne Plant, Western Electric Company. Oil-fired for controlled operation at 1700°F. Ten burners at the discharge end; five over and five under the billets, and a recuperator to heat the air.



Hydraulic pushers move the charge into a heating-chamber 12' 3" wide and 38' long. Capacity is 60,000 lbs. per hour. This R-S Furnace, installed in 1930, is typical of the long life, low upkeep, and high productiveness of R-S Furnaces.

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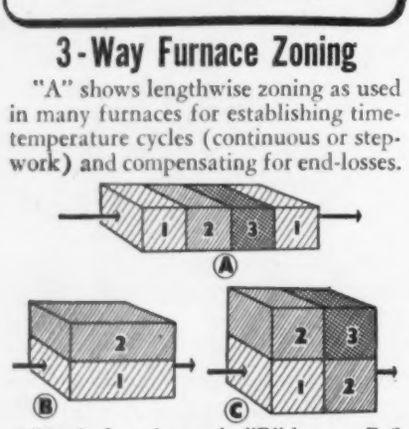
3-Way Furnace Zoning

"A" shows lengthwise zoning as used in many furnaces for establishing time-temperature cycles (continuous or step-work) and compensating for end-losses.



Vertical zoning as in "B" is rare. R-S engineers find it heats faster and gives more uniform temperatures with large charges, either batch or continuous. Combination zoning, in "C", is seldom called for, but when it is needed you can be sure that R-S engineers think vertically as well as horizontally JMLCo P-F1

FURNACE DIVISION
R-S Products Corp.
PHILADELPHIA 44, PA.

report demand well in excess of current output. With two mill stacks down, basic appears tighter as one consumer is bringing in iron from another point. Tension over ore stocks has subsided with heavy receipts reported by boat from Duluth.

Cincinnati—Foundries in this district, dependent on unimproved allotments of pig iron, have been unable to build stocks against any possible curtailment in supplies.

Seattle — Foundry operations are close to capacity in most plants. Larger receipts of cast iron scrap are reported but pig iron supply is still tight.

Birmingham—Pig iron production still falls short of demand. Some observers expect a measure of relief because of the anual vacation season.

Scrap...

Heavy melting steel scrap buying is active in several districts at higher levels

Scrap Prices, Page 152

Cleveland—A strong price tone developed in the scrap market here last week. Heavy melting steel sold at $35, Valley, and was quoted $31 to $34, delivered to Cleveland mills. Machine shop turnings advanced to $27 to $27.50; mixed borings and turnings and short shovel turnings, $28; bar crops and plate, No. 1 cast steel, punchings and plate scrap, $35.50 to $37; electric furnace bundles, $33.50 to $35; heavy turnings, $32 to $33.50. No. 1 railroad heavy melting also was quoted higher at $35 to $37. Buying was active at the higher prices and shipments continued fairly heavy, some still being made on old contracts at the previous lower levels.

Detroit—Local mills have re-entered the market for open-hearth scrap and are paying $31.00 and $31.50 per ton, after weeks of refusing to meet the higher prices being quoted. This, plus the fact brokers have been compelled to pay higher prices to cover old orders, has moved the price level on steel grades, dealers' buying prices, to $27.50-$28.00, up $1.50 per ton. Mills here are comfortably fixed as far as stocks are concerned, so current buying is limited in quantity, being more of a test or fill-in nature than anything else. Sentiments of leading brokers are somewhat at variance for the first time in a good while, although the consensus is for further price advances as long as steel demand holds at peak. Bulk of automobile scrap continues to be earmarked to specific mills, a practice which certainly will not change as long as the price trend is upward. Borings and turnings are following open-hearth material in the price rise, although at a more moderate pace. Electric furnace scrap is quoted $1 a ton higher. Cast grades continue lethargic.

Philadelphia—While scrap demand is active, the flow is not what it should be, especially in view of the further increases in prices. Sellers ascribe some of this sluggishness in movement to the fact that the market for metals, rags and paper has slumped rather severely over recent weeks and that the small collectors, therefore, are not traveling around as much as they were, with a resultant drop in iron and steel scrap collections.

Steel mill scrap is generally higher, with a narrowing in the price differentials. No. 1 heavy melting is now holding at $32 to $32.50, delivered; No. 2 melting and No. 1 busheling, $31 to $32; No. 1 bundles, $32 to $32.50; No. 2 bundles, $31 to $32; and No. 3 bundles, $29 to $30.

Machine shop turnings are $24 to $25; mixed borings and turnings, $22 to $23; short shovel turnings, $25 to $25.50. Bar crops and plate and punchings are higher at $35.50 to $36.50; electric furnace bundles, $33.50 to $34.50; heavy turnings, $33 to $33.50; No. 1 chemical borings, $30 to $31.

No. 1 cupola cast is up $1 to $43 to $44, delivered. Heavy breakable cast has been advanced to $41 to $42, and is in especially heavy demand by the steel mills at present. Unstripped motor blocks are higher at $39 to $40; clean auto cast, $43 to $44.

New York—Scrap brokers report strong demand from eastern Pennsylvania consumers of melting steel, although a relatively less active buying demand from the Pittsburgh area. Meanwhile brokers' buying prices are generally higher. No. 1 and No. 2 heavy melting steel, No. 1 busheling, and No. 1 and No. 2 bundles are now quoted $27 to $27.50, fob shipping point, with all differentials on these grades having been eliminated. No. 3 bundles are higher at $25 to $25.50.

Machine shop turnings and mixed borings and turnings have been advanced to $20.50 to $21 and short shovel turnings to $22 to $22.50. Punchings and plate scrap and cut structurals are now at a flat $30, and electric furnace bundles at $28.50 to $29. No. 1 cupola cast is higher at $37 to $38 and charging box cast and heavy breakable at $36 to $37.

Boston — Rebound in open hearth prices is more orderly than was the decline. First advances, totaling about $3 in two moves, were based largely on Pennsylvania buying. Steel scrap grades have been following the increase in heavy melting hesitatingly. Flow of scrap reaching yards and production of industrial material have been slower. Differential for busheling is now more generally $1. Cast iron continues dull and lack of buying marks failure of those grades to match the advance in steel scrap.

Pittsburgh—Major mills continue out of the market, with one interest still holding up shipment on old $30 orders. However, some of the smaller mills have purchased sufficient tonnage at $32.50 for open-hearth scrap to establish the market at that level. As long as mills in surrounding areas continue to place orders at recently advanced quotations, it would appear probable that next substantial tonnage purchased here will confirm the $32.50 price. Firmer price tone is noted for low phos scrap, with sales reported in range of $39 to $40. No significant price revision in cast scrap items occurred last week. The Pennsylvania railroad's scrap list awards are expected to be released this week. It is reported some interests bid within the range of $37 to $37.50 for the heavy melting steel; railroad specialties, $42 to $43.

Buffalo—Firmer tendencies pervaded the scrap market here last week with prices showing no immediate indications of backing way from recenty-advanced levels. Bolstering the list also is the slow seasonal expansion in collections. Prolonged torrential rains have seriously

interrupted the movement of scrap from rural districts. No new business of consequence was reported during the week as dealers shipped against outstanding orders placed at $31-$32 a ton for heavy melting and bundles. Foundries have begun to notify dealers to hold up cast shipments during vacation periods. Another boatload, the second of the season, arrived from the Duluth area with 5000 tons. High waters, caused by the heavy rains, are delaying canal scrap.

Chicago — Open hearth scrap holds nominal at $29 delivered mill. While the market has a decidedly firmer tone than a week ago, volume buying is lacking. Because of this and also because of the possibility of coal mine stoppage after June 30, there could be pricewise developments at almost any moment. Consumers continue to receive substantial volume of scrap from old contracts, but there is some speculation as to whether the flow at the moment is much in excess of consumption.

Cincinnati — Scrap prices have moved upward, in most grades by $1. A strong undertone developed on basis of activities in nearby districts, and this now is reflected in dealings which do not, however, go into heavy tonnages.

Birmingham—Trading in scrap is described locally this week as "conservative." The market is relatively inactive. Prices show a marked tendency toward firmness.

St. Louis — Scrap shipments to this district continue to ease off in the face of price uncertainties. Normally there is a rather sharp seasonal drop and this has been aggravated by delay in establishment of a price pattern, this in turn a result of the upward trend in eastern markets. As a consequence of low shipments and indecisive prices, mill and foundry scrap reserve have declined from an approximate 60-day level to 45 or 50 days.

Seattle — Steel scrap is arriving at mills in adequate quantities to enable some accretion to inventories. Limited tonnages are coming from ship breaking plants at Portland, Oreg., Kalama, Wash., and locally. Flow of this material is expected to increase. Normal sources of supply are shipping increasing tonnages and the mill outlook is now fairly satisfactory. Heavy melting steel price remains firm at $20 a gross ton, fob plant, and $16.50 for outports. No. 1 cupola cast iron scrap price is unchanged at $27.50.

Iron Ore. . .

Iron Ore Prices, Page 148

Cleveland—Lake Superior Iron Ore shipments totaled 10,372,853 gross tons last month, an increase of 6,756,738 tons, or 186.85 per cent over the May, 1946, total of 3,616,115 tons, according to the Lake Superior Iron Ore Association, this city. This brought the total for the season to 14,821,264 tons, an increase of 10,475,247 tons, or 241.03 per cent over the 4,346,017 tons for the like 1946 period.

Of last month's shipments, Escanaba accounted for 582,816 tons; Marquette, 602,840; Ashland, 734,595; Superior, 3,540,603; Duluth, 2,500,102; and Two Harbors, 2,220,008, making the total for United States ports 10,180,964. Canadian ports accounted for 191,889 tons, of which 129,134 tons came from Port Arthur and 62,755 tons from Michipicoten.

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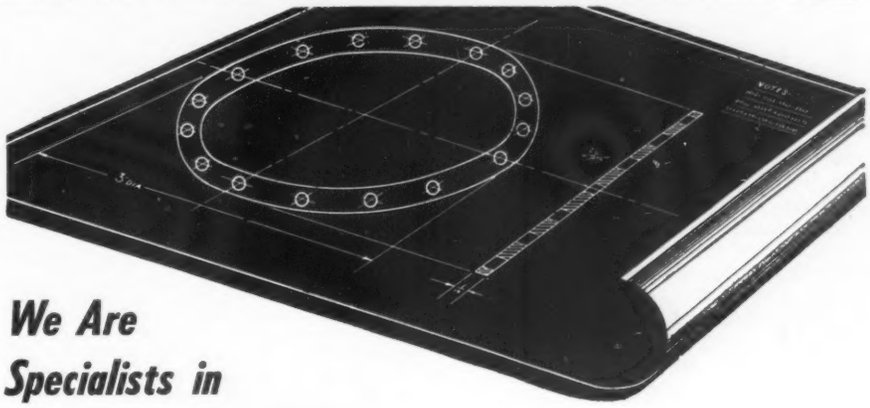

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Rails, Cars . . .

Track Material Prices, Page 147

New York—Freight car orders in May involved 7390 units as compared with the revised total of 8861 for April, according to the American Railway Car Institute. This brings the revised total for the first five months up to 51,174. Commercial car builders and railroad shops have a backlog of 101,430 units as of June 1.

Freight cars produced in May amounted to 3929 units. This is a decline from the 4123 cars delivered during April, but exceeds substantially production in earlier months in the year. A continuing uneven flow of materials to car builders' shops and strikes in several plants were responsible for the reduced May schedule, the institute said.

Canada . . .

Toronto, Ont.—Primary iron and steel shape production in Canada totaled 282,545 net tons compared with 257,556 tons in February and 240,619 tons in March, 1946. Shipments, including producers' interchange of 68,045 tons, amounted to 284,438 tons compared with 211,059 tons in February and 253,012 tons in March of last year. First quarter production totaled 807,612 tons compared with 721,725 tons in the like 1946 period while shipments totaled 818,810 tons compared with 724,115 tons.

Shipments of primary iron and steel shapes during March included 20,767 tons of semifinished shapes, 13,126 tons of structurals, 17,329 tons of plates, 19,945 tons of rails, 49,850 tons of hot-rolled bars 13,738 tons of pipes and tubes, 18,698 tons of wire rods, 16,272 tons of black sheets, 8629 tons of galvanized sheets, 538 tons of tool steel, 5971 tons of castings, 31,530 tons of other shapes, and 68,045 tons went to producers' interchange.

Of the March shipments, 41,883 tons went to the railways and railway car shops; 11,349 tons to pressing, forming and stamping plants; 22,420 tons to merchant trade products; 23,483 tons to building construction; 17,792 tons to the container industry; 9365 tons to the agricultural implement industry; 13,459 tons to the automotive industry; 13,074 tons to machinery plants; 3894 tons to shipbuilding; 8466 tons to mining, lumbering, etc.

Material Stocks Deliveries Show Some Improvement

(*Concluded from Page* 59)

less than 60 days. Stocks are comfortable.

Individual companies find specialty items particularly hard to get. These include high-carbon spring wire, cold-rolled deep drawing spinning steel, and copper magnet wire.

A number of companies which normally buy from mills are obtaining a part of their tonnage from warehouses.

A few companies report they have been left without a mill source of supply as the result of purchase of small steel mills by other metalworking companies. Such purchases usually have been made to insure a steel supply to the buyer; former customers have been orphaned and often unable to obtain a satisfactory position on the books of other mills.

Unbalance in inventories is a major problem with many companies. Almost without exception, metalworking executives say they are unable to obtain sufficient quantities of flat-rolled materials. Less general are complaints of inability to receive the sizes needed in other products, such as bars, large structural shapes and wire. Particularly is this true in the small sizes of bars. A screw bolt and nut manufacturer points out that overall tonnage on hand indicates a two-month inventory. However, a large percentage of its products is produced in sizes 5/16 in. diameter and smaller. Stock list for these sizes show absolute vacancies.

Several companies, however, report they currently are trimming inventories, due to unbalance or because manufacturing operations have been hampered by shortages of materials other than metals.

PLATES . . .

PLATES PLACED

460 tons, two storage tanks, Hartol Co., Revere, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

430 tons, including shapes, 1 million gallon elevated steel tank, Maple Leaf District, Seattle, to H. D. Fowler, Seattle, for Pittsburgh-Des Moines Steel Co., Pittsburgh.

PLATES PENDING

Unstated, tanks, Monsanto Chemical Co., plant, Seattle; general contract to H. S. Wright, Seattle.

Unstated, 12,000 feet steel plate and concrete siphon, 23 and 25 feet diameter, for Soap Lake project, Columbia basin; bids to Bureau of Reclamation, Denver, July 15.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2700 tons, transmission towers, Detroit Edison Co., Detroit, to American Bridge Co., Pittsburgh.

1100 tons, boiler house extension, General Electric Co., Schenectady, N. Y., through the United Engineers, Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

1000 tons, addition, Heckman Biscuit Co., Grand Rapids, Mich., to Whitehead & Kales Co., Detroit; Giffels & Vallet, Detroit, engineers.

1000 tons, warehouse, Kresge stores, Hillside, N. J., through David L. Evans, to Bethlehem Steel Co., Bethlehem, Pa.

900 tons, building, A. G. Spaulding & Bros., Willimansett, Mass., to Haarmann Steel Co., Holyoke, Mass.

800 tons, 26th ward sewerage disposal plant, Brooklyn, N. Y., through Tobias Heller Co., to Bethlehem Steel Co., Bethlehem, Pa.

800 tons, St. Joseph's hospital, Hazelton, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

698 tons, tunnel beams, 40-N-7347-Y, Union Pacific railroad, Wyoming, to Consolidated Steel Corp. Ltd., Los Angeles.

600 tons, disposal plant, National Lead Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, power house, United Illuminating Co., Bridgeport, Conn., through Westcott & Mapes, New Haven, Conn., to American Bridge Co., Pittsburgh.

554 tons, tunnel beams, 40-N-7348-Y, Union Pacific railroad, Wyoming, to Consolidated Steel Corp. Ltd., Los Angeles.

500 tons, sports arena, Worcester, Mass., through the Archroof Construction Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

480 tons, Daily News garage, East 41st St., New York, through Starrett Bros. & Eken Inc., 63 Wall St., New York, to Lehigh Structural Steel Co., Allentown, Pa.

460 tons, building, Richmond Radio Corp., Richmond, Va., to Lehigh Structural Steel Co., Allentown, Pa.

310 tons, store building, H. L. Green, Hempstead, Long Island, through Alfred H. Lutz, to Schacht Steel Construction Co. Inc., New York.

290 tons, Bergen St. trolley coach depot, Board of Transportation, Brooklyn, N. Y., to the Schacht Steel Construction Co. Inc., New York.

250 tons, storage facilities, New York Power & Light Co., Albany, N. Y., to the Hammond Iron Works, Warren, Pa.

200 tons, store, J. C. Penny Co., Jackson, Miss., to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, bridge, Peoria, Ill., for state, to Pittsburgh-Des Moines Steel Co., Pittsburgh; Brogan Construction Co., contractor.

STRUCTURAL STEEL PENDING

1745 tons, bridge, Decatur, Nebr., for Burt County Bridge Commission.

1600 tons, state bridge over Connecticut river, Greenfield, Mass.

1500 tons (revised estimate), Lady of Lourdes hospital, Camden, N. J.; bids postponed until June 24.

1500 tons, sheet piling, power house, Sault Ste. Marie, Mich., for government; bids June 18.

1200 tons, Lewiston bridge, Idaho, for Bureau of Highways; bids of May 23 rejected.

600 tons, veterans hospital, New Britain, Conn.; bids in.

600 tons, sheet piling and H-piling, breakwater pier heads, Keweenaw waterway, Houghton, Mich., for U. S. Engineer, Duluth.

550 tons, Valley Hospital, Ridgewood, N. J., bids asked.

380 tons, bunkers, railings, lintels, etc., Springfield Ave. pumping station, Department of Public Works, Chicago; bids June 27.

300 tons, Chevrolet Motor Division, General Motors Corp., Janesville, Wis.; bids June 19.

300 tons, hospital, East Stroudsburg, Pa.; bids July 10.

250 tons, addition School No. 92, Brooklyn, N. Y., bids closed June 10.

250 tons, Monsanto Chemical Co. plant, Seattle; general contract to H. S. Wright, Seattle. Seattle.

225 tons, approximately, addition, School No. 41, Staten Island, N. Y., bids June 18.

150 tons, sheet piling, power house, Bellevue, Nebr.; Bates & Rogers Construction Co., contractor.

Unstated, Washington state steel girder highway bridge, Lewis county; bids to Olympia, June 24.

REINFORCING BARS . . .

REINFORCING BARS PLACED

400 tons, Washington state highway projects, cold storage plant and Monsanto Chemical Co. plant, Seattle, to Bethlehem Pacific Coast Steel Co., Seattle.

160 tons, factory building, Furst-McNess Co., Freeport, Ill., to Truscon Steel Co., Youngstown, O.; Henry Pfutzenreuter & Sons, Chicago, contractor.

100 tons, Tri State highway, Sec. 193-2526.1, for Cook county, Ill., to Joseph T. Ryerson & Son Inc., Chicago; Thomas McQueen Co., Forest Park, Ill., contractor.

REINFORCING BARS PENDING

2000 tons, third unit, Ross Skagit Dam, Seattle; contract under negotiation.

600 tons, Army air base, Rapid City, S. D.; bids June 9.

600 tons, veterans hospital, Miles City, Mont., for U. S. Veterans Administration; bids extended from June 6 to July 8.

575 tons, various projects in Oregon, Washington

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and Wyoming, Bureau of Reclamation, Denver; bids last half of June.

375 tons, E. 83rd St. subway substructure and superstructure, Department of Public Works, Chicago; bids June 17.

200 tons, accelerator building, University of Chicago.

110 tons, county girder-type bridge, Yakima, Wash.; general contract to Rumsey & Co., Seattle.

Unstated, plant expansion, Fisher Flouring Mills, Seattle; general contract to George E. Teufel, Seattle.

Unstated, plant expansion, Sick's Brewery, Seattle; general contract to Strand & Sons, Seattle.

Unstated, $350,000 warehouse, 400 x 153 ft; bids to Associated Grocers Cooperative, 1916 Occidental Ave., Seattle, June 17.

Unstated, Kostner Ave. auxiliary outlet sewers, Department of Public Works, Chicago; bids June 30.

PIPE . . .

CAST IRON PIPE PENDING

1300 tons, 4 to 12-inch cast iron pipe, for Tacoma, Wash.; bids June 16.

500 tons, assorted sizes, Bellingham, Wash.; bids in.

100 tons, 4 and 6-inch cast iron pipe, Helena, Mont.; bids in.

Unstated, 16-inch pipe line, estimated at $35,000; bids to University of Washington, Seattle, June 17.

Unstated, North 105th St. improvement; general contract to Argentieri & Colarossi, Seattle, low $31,911.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Atchison, Topeka & Santa Fe, 25 diesel-electric locomotives, including eight 6000-horsepower passenger units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.; four 4000-horsepower passenger and four 1000-horsepower switch engines to the American Locomotive Co., New York; six 1000-horsepower switch engines and one 2000-horsepower transfer locomotive to Baldwin Locomotive Works, Eddystone, Pa.; and two 1000-horsepower switch engines to Fairbanks, Morse & Co., Chicago.

Chicago Great Western, nine 1000-horsepower diesel-electric switch engines, to Electro-Motive Division, General Motors Corp., La Grange, Ill.; and five 660-horsepower diesel-electric switch engines, to American Locomotive Co., New York.

St. Louis-San Francisco, twenty-five 1500-horsepower diesel electric freight units and four 1000-horsepower diesel-electric switch units, to Electro Motive Division, General Motors Corp., La Grange, Ill., and six 1000-horsepower diesel-electric switch units, to Fairbanks, Morse & Co., Chicago.

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 250 seventy-ton drop-end gondola cars and 125 seventy-ton covered hopper cars, to American Car & Foundry Co., New York.

Baltimore Transit Co., Baltimore, 25 trolley coaches, to ACF-Brill Motors Co., Philadelphia.

Chicago, Milwaukee, St. Paul & Pacific, 125 passenger cars, to its Milwaukee shops; included are 56 coaches, 20 baggage cars, 17 mail-express cars, 12 parlor cars, 6 dining cars, 6 cafe-parlor cars, 2 dining-lounge cars, 2 taproom dining-lounge cars, 2 baggage-dormitory cars, and 2 post office cars.

Duluth, Missabe & Iron Range, 500 seventy ton ore cars, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

Baltimore & Ohio, 3000 hopper cars of which 2000 will be 70-ton capacity and 1000, 50-ton capacity; these are in addition to 8500 freight cars already on order.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MONTGOMERY, ALA.—Leary-Owens Machinery Co. has let contract to Mac Saxton for construction of 2-story building. Architects are Pembleton & Mims, Birmingham.

ARKANSAS

MAGNOLIA, ARK.—D. E. Buchanan has awarded a $2,225,000 contract to Petroleum Engineering Inc., National Bank Bldg., Tulsa, Okla., for construction of a gasoline recovery plant here.

CALIFORNIA

CENTRAL VALLEY, CALIF.—Bureau of Reclamation, Department of Interior, has awarded a $470,000 contract to General Electric Co., Denver, for equipment for Shasta and Keswick switchyards on the Central Valley project. A $93,000 contract for seven disconnecting switches was awarded to A. B. Chance Co., San Francisco.

GLENDALE, CALIF.—Pacific Telephone & Telegraph Co., 124 S. Orange St., has awarded a $320,000 contract to P. J. Walker Co., 3900 Whiteside St., Los Angeles, for a building addition.

LOS ANGELES—Clark & Sawyer Inc. has been formed by Ralph O. Clark and associates with a capital of $75,000 to manufacture and deal in tools, machinery and machinery supplies. Firm is represented by Watkins & Charlton, 1035 Bartlett Bldg.

CONNECTICUT

HARTFORD, CONN.—Royal Typewriter Co., 150 New Park Ave., has awarded a $55,000 contract to Denis O'Brien & Son, 190 Trumbull St., for a 1-story, 50 x 110 ft factory addition.

TORRINGTON, CONN.—Torrington Mfg. Co., 70 Franklin St., has awarded a $70,000 contract to Torrington Building Co., 187 Church St., for a 1-story factory addition.

INDIANA

HAMMOND, IND.—Swift & Co. has awarded a contract to Blaw-Knox Co. for construction of a plant to produce glycerin.

INDIANAPOLIS—American Can Co. plans to build a 2-story warehouse, 80 x 581 ft, next to its plant on South East St. Cost will be $421,000.

INDIANAPOLIS — Pitman Moore Co., 1200 Madison Ave., has awarded a $1 million contract to Carl M. Geupel Construction Co., 1109 Hume Mansur Bldg., for a 6-story building to be used as plant, laboratory and office.

MARION, IND.—Anaconda Wire & Cable Co., E. A. Renfer, manager, S. Eighth St., has awarded a $117,000 contract to Bowman Construction Co., 1126 S. Branson St., for a 1-story factory addition, 120 x 140 ft.

MARYLAND

BALTIMORE—Rustless Iron & Steel Co. has let a $300,000 contract to Cummins-Hart Construction Co., 2023 N. Charles St., for crane runway at 1001 Edison Highway.

SPARROWS POINT, MD.—Bethlehem Steel Co., Bethlehem, Pa., has awarded a $250,000 blast furnace contract to Arthur G. McKee & Co., 2300 Chester Ave., Cleveland. A $640,000 contract for No. 1 soaking pit building, extension to east end of building 1 and foundations for a power station has been awarded to James Stewart & Co., 230 Park Ave., New York.

MASSACHUSETTS

CHICOPEE, MASS.—A. G. Spaulding & Bros. will build a factory addition on S. Meadows St. costing $5,500,000.

MICHIGAN

BAY CITY, MICH.—Continental Body Inc., Euclid Ave., has been formed by Fred E. Kaunitz Jr., 500 S. Columbian St., with a capital of $200,000 to manufacture truck equipment, cranes and operate a machine shop.

DETROIT—National Automotive Fibres Inc., 19925 Hoover Ave., has awarded a $52,000 contract for plant additions to O. W. Burke Co., 1032 Fisher Bldg.

WYANDOTTE, MICH. — Pennsylvania Salt Mfg. Co. has under construction at its plant here additional boilers and allied power generating equipment, including a new power plant building, to cost over $3,500,000.

MISSISSIPPI

GULFPORT, MISS.—Gulf Paint & Chemical Co. contemplates construction of a paint manufacturing plant to cost about $1 million.

NEW YORK

BUFFALO—Buffalo Metal Furniture Mfg. Co. has been incorporated by Anthony B. Vick with capital of $100,000.

NIAGARA FALLS, N. Y.—American Brake Shoe & Foundry Co., 230 Park Ave., plans to make additions and alterations to its plants at a cost of $435,000. Architect is W. L. Olson, Ramapo Valley Rd., Mahwah, N. J.

OHIO

CLEVELAND.—Anchor Rubber Products Corp., 1725 London Rd., will build a 1-story addition to its plant to increase production of automotive replacement parts. Cost is estimated at $129,000.

CLEVELAND—Baker-Raulang Co., 2168 W. 25th St., plans construction of a $194,000 addition to its plant to be used for assembling of industrial power trucks.

CLEVELAND — Addressograph Multigraph Corp., 1200 Babbit Rd., will build a warehouse addition containing 30,000 sq ft of floor space. Cost will be about $81,000.

COLUMBUS, O.—Hercules Body & Sales Co., 134 E. Goodale St., has awarded a $58,000 contract to Lee E. Ruisinger Inc., 851 Frebis Ave., for a 1-story factory addition.

MEDINA, O.—Nichols Refrigeration Co., located three miles south of State Route 3, has been incorporated by Arthur O. Nichols with a capitalization of $100,000 to manufacture and sell milk coolers and home freezers.

TOLEDO, O. — Toledo Edison Co., Edison Bldg., has awarded a contract to A. Bentley & Sons Co., 201 Belmont Ave., for a boiler and turbine room addition and a power house at 1401 Front St. Cost is estimated at $1,801,800.

YOUNGSTOWN—J. L. Shilling Co. of Ohio Inc. has been incorporated by Hugh W. Manchester and Associates with a capital of $100,000 to manufacture, fabricate and deal in metal and plastics. Firm is represented by Myron E. Ullman, 1106 National Bank Bldg.

PENNSYLVANIA

HAZELTON, PA.—Oliver United Filters, P.O. box 389, plans to build plant additions costing $100,000.

PHILADELPHIA—J. Gibson McIlvain, 58th St. & Woodland Ave., has awarded a $75,000 contract to F. V. Warren Inc., Lewis Tower Bldg., for a kiln building, boiler house and mill and tower.

PHILADELPHIA—Welsbach Engineering & Management Corp., 1400 Walnut St., has awarded separate contracts totaling over $55,000 for alterations and additions to its plant on 2409 W. Westmorland St.

RHODE ISLAND

PROVIDENCE, R. I.—Seaboard Screw Corp. has been newly formed with George S. Clowes as president. Firm will start a plant here for manufacture of machine products.

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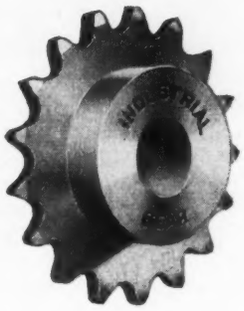

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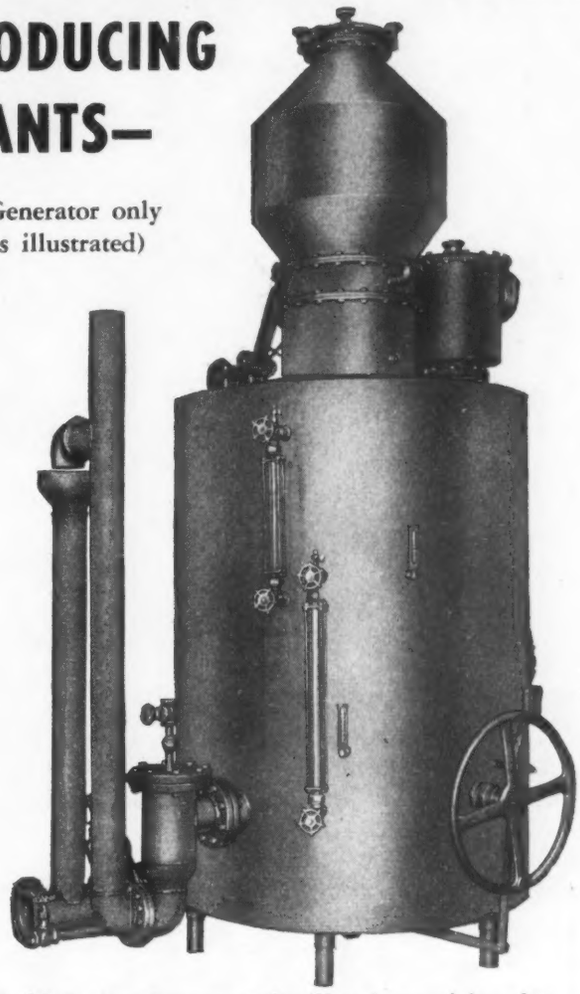

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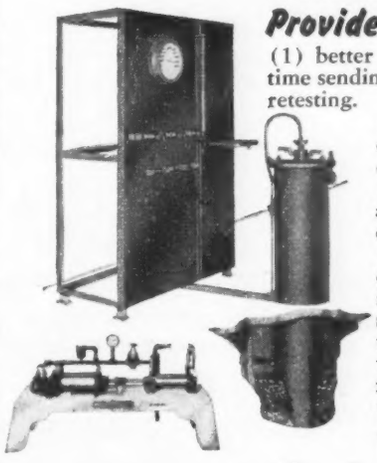

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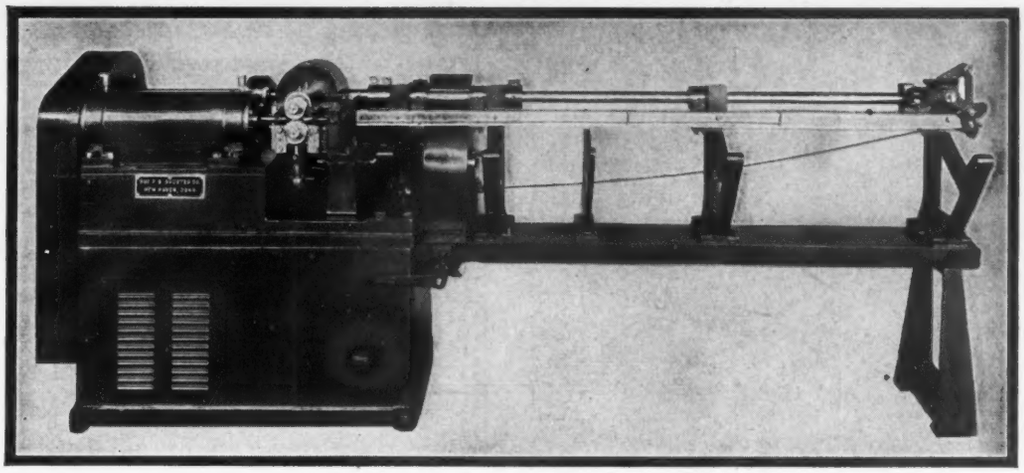

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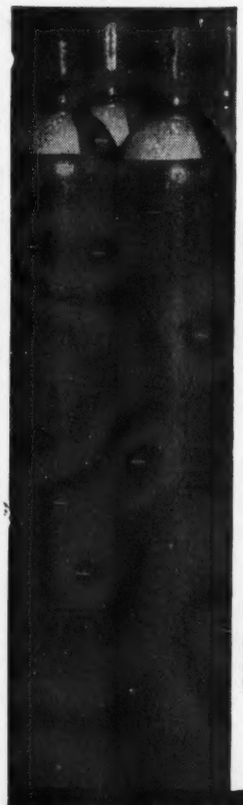

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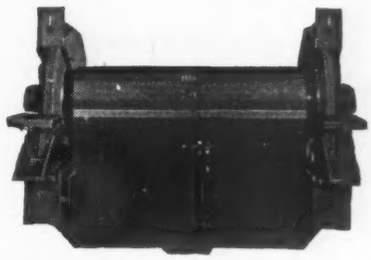

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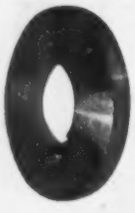

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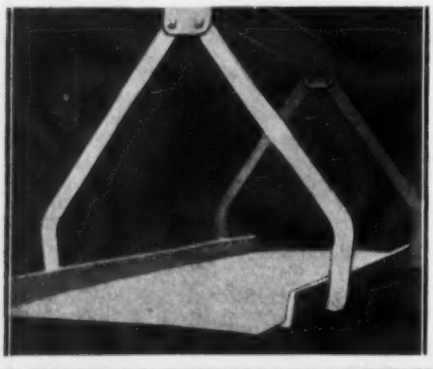

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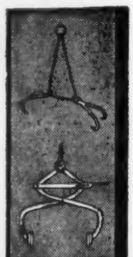

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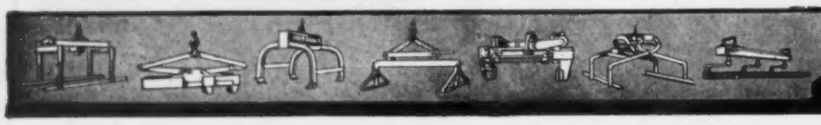

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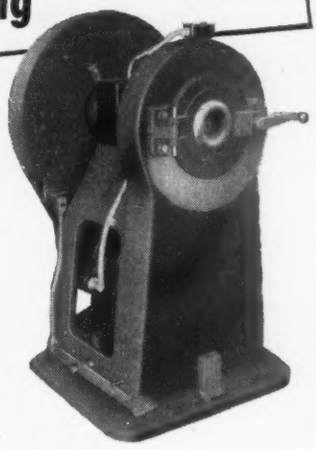

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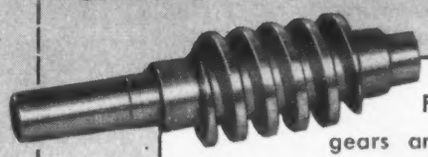

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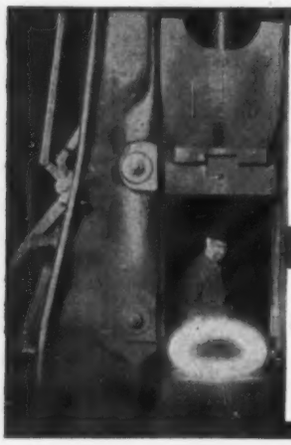
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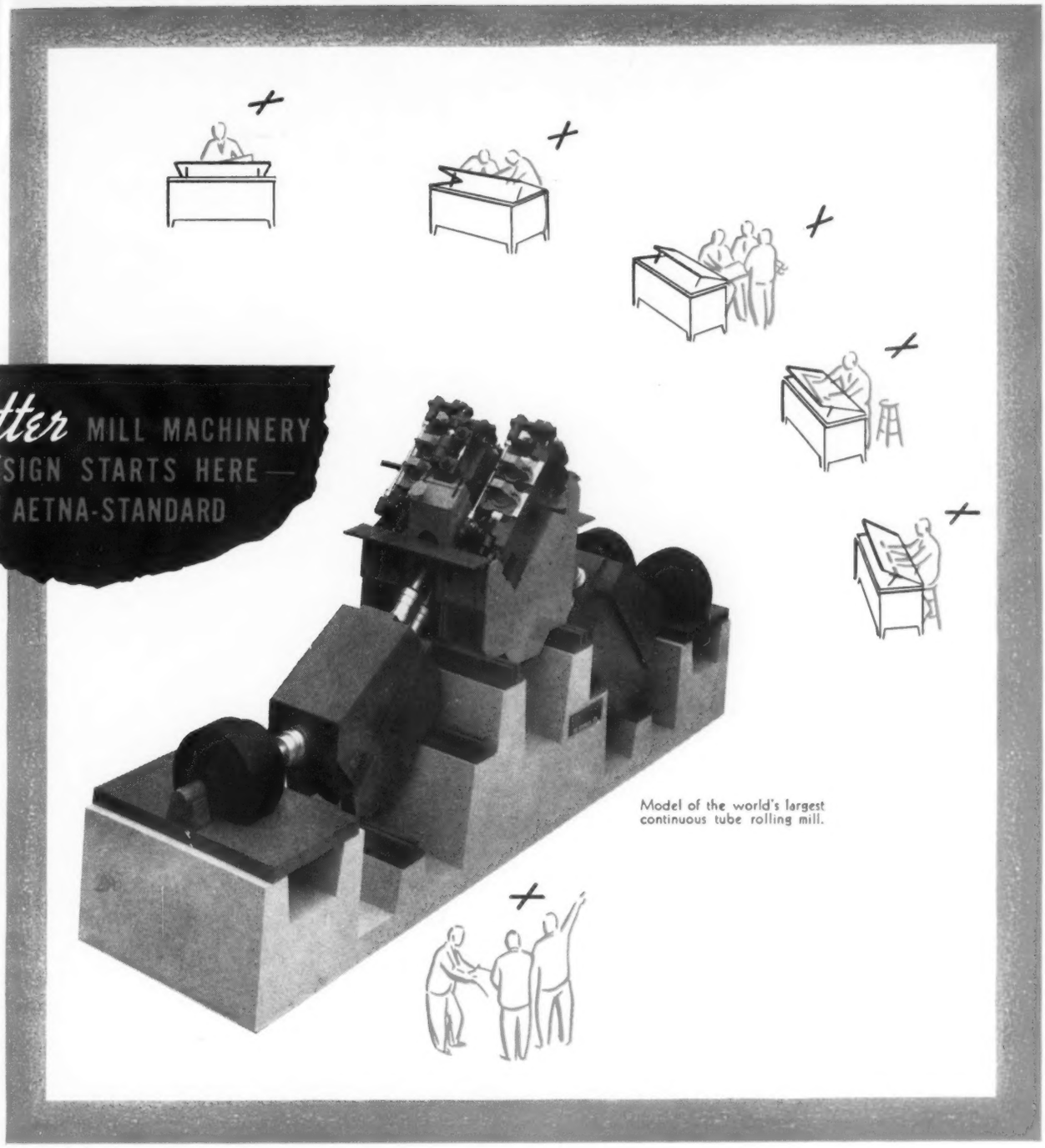

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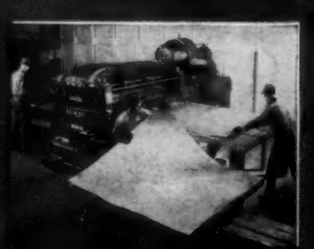

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